

High Pressure Cartridge Valves

Mechanical

Designation	Description	Cavity	Data sheet	Pages
Pressure relief valve, pilot operated	MHDBV	Special	RE 64605	895
Pressure relief and anti-cavitation valve, pilot operated	MHDBN	Special	RE 64602	903
3-way pressure reducing valve, direct operated	MHDRDB	Special	RE 18111-04	915
Shuttle valve	MHSU	Special	RE 18205	923
Flow regulator LS	MH2FR	Special	RE 18351	929
2-way logic element, direct operated	MH2DAD	Special	RE 64586	937

Pressure relief valve, pilot operated

RE 64605/03.09

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Type MHDBV (high-performance)

Sizes 16 and 22
Component series 3X
Maximum operating pressure 420 bar
Maximum flow 240 l/min



H7567

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Features

- Cartridge valve
- For mobile applications
- Pressure ratings from 100 to 420 bar

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

MH	DBV		K	2	-3X/				*
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Mobile hydraulics
Pressure relief valve, pilot operated
Size 16 = 16
Size 22 = 22
Screw-in cartridge valve = K
Adjustment type
Setscrew with hexagon socket = 2
Component series 30 to 39 = 3X
(30 to 39: unchanged installation and connection dimensions)
Pressure rating ¹⁾
100 bar = 100
420 bar = 420
Without pressure setting, without protective cap ²⁾ = No code
With pressure setting, with protective cap = -... ³⁾

Further information in the clear text
Mounting cavity
FB = M24 x 1
FC = M28 x 1
LG = M30 x 1.5
See page 7
Seal material
M = NBR seals
V = FKM seals
(other seals at request)
Attention!
Observe compatibility of seals with the hydraulic fluid used!

¹⁾ The values refer to the screw-in cartridge valve. When installing the valve into a housing, make sure that the set pressure of the screw-in cartridge valves does not exceed the potentially lower value of the housing!

²⁾ Protective cap separately available, material no. **R900168151**

³⁾ Example:
Set to 300 bar: ...420-**300**...
(Pressure setting with $q_{Vmax} = 10 \text{ l/min}$)

Attention!
Factory-set valves are secured by means of a protective cap.
In case of subsequent adjustment, the warranty will forfeit!

Standard types

Type	Material number	Mounting cavity (see page 7)	Characteristic curve (see page 5)
MHDBV 16 K2-3X/100MFB	R901188456	FB	D1
MHDBV 16 K2-3X/420MFB	R901188404	FB	D1
MHDBV 22 K2-3X/100MFC	R901188510	FC	D2
MHDBV 22 K2-3X/420MFC	R901188506	FC	D2

Function, section, symbol

The pressure valve type MHDBV is a pilot operated pressure relief valve for installation in block constructions. It is used for limiting the system pressure. The system pressure is set via the adjustment element (4).

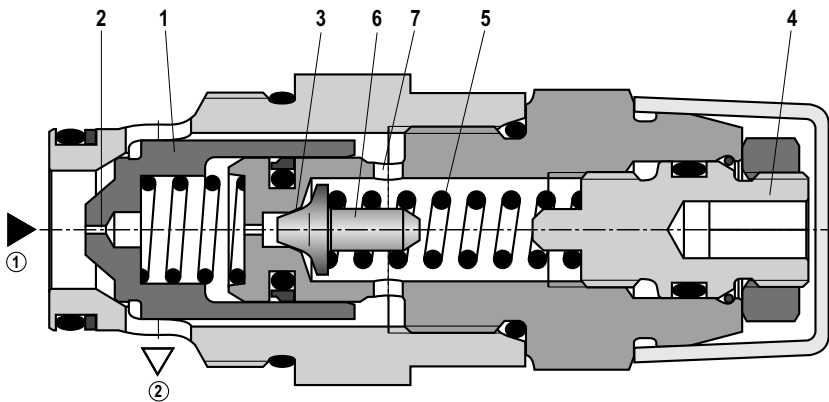
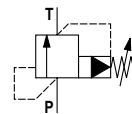
Pressure relief function

In its initial position, the valve is closed. The pressure in the main port ① acts on the spool (1). Simultaneously, the pressure is - via the orifice (2) - applied to the spring-loaded side of the spool (1) and to the pilot poppet (6). If the pressure in the main port ① exceeds the value set at the spring (5), the pilot poppet opens (6). Via the orifice (3) and the channel (7), the hydraulic fluid from the spring-loaded side of the spool flows into the main port ②. The pressure drop created in this way moves the spool (1) and thus opens the connection of the main port ① to ② while maintaining the pressure set at the spring (5). The pilot oil is returned internally via the channel (7) to the main port ②.

Note!

- The maximum operating pressure is the sum of the set pressure and backpressure at main port ②.
- The pilot operated pressure valves are almost leak-free, according to their design.

Symbol



Type MHDBV...

① = Main port 1 (P)

② = Main port 2 (T)

Technical data (For applications outside these parameters, please consult us!)

general		
Weight	kg	See page 6
Installation position		Any
Ambient temperature range	°C	–20 to +80 (NBR seals) –20 to +80 (FKM seals)
Surface protection		The valve doesn't have any surface protection. Surface protection is to be ensured by painting the components and/or the whole assembly (e.g. valve with housing).

hydraulic

Maximum operating pressure	– Main port ① (P)	bar	100; 420
	– Main port ② (T)	bar	50
Maximum flow		l/min	See characteristic curves on page 5
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524 ¹⁾ ; Quickly biodegradable hydraulic fluids according to VDMA 24568 (also see RE 90221); HETG (rape seed oil) ¹⁾ ; HEPG (polyglycols) ²⁾ ; HEES (synthetic esters) ²⁾ ; other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–30 to +80 (NBR seals) –20 to +80 (FKM seals)
Viscosity range		mm ² /s	10 to 380
Max. admissible degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ³⁾
Load cycles			2 mio

¹⁾ Suitable for NBR and FKM seals

²⁾ Only suitable for FKM seals

³⁾ The cleanliness classes specified for the components must be complied with in hydraulic systems. Efficient filtration prevents malfunctions and simultaneously increases the service life of the components.

For the filter selection, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

Note!

The technical data was determined at a viscosity of $v = 41 \text{ mm}^2/\text{s}$ (HLP46, $\theta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$).

The minimum cracking pressure lies over 0.5 bar. Thus, a supply pressure $\geq 4 \text{ bar}$ is recommended.

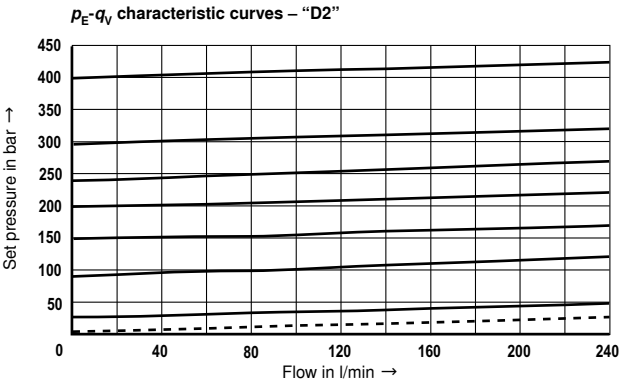
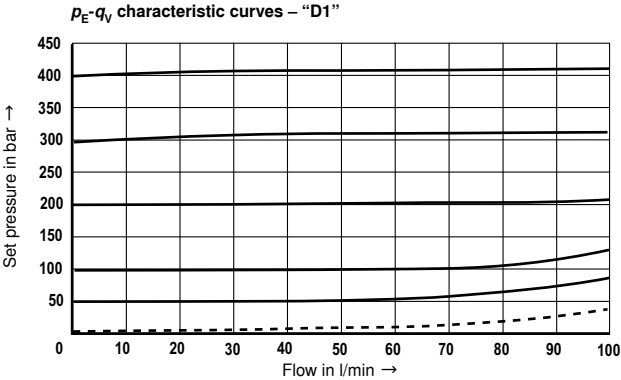
The following documentation must be observed:
RE 64020-B1 "Hydraulic valves for mobile applications"

Attention!

Under conditions of use at an operating pressure of $< 30 \text{ bar}$ and a flow of $< 30 \text{ l/min}$, valves with another design are to be selected from our valve program.

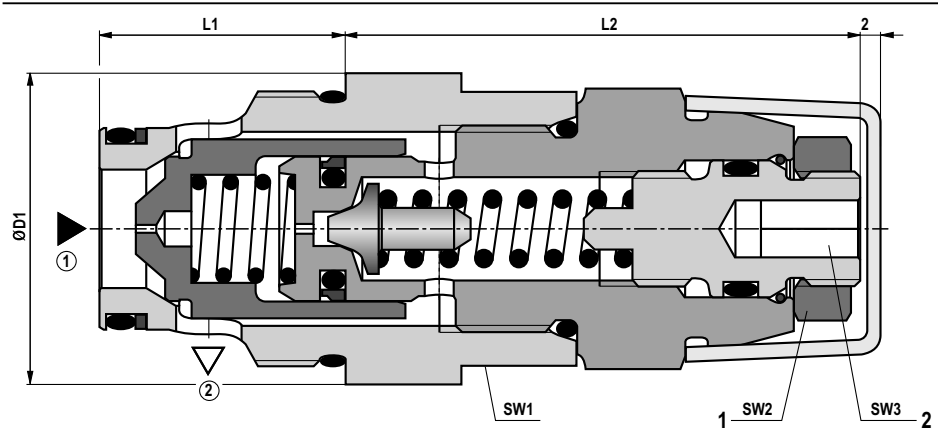
The maximum operating pressure is the sum of the set pressure and backpressure!

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

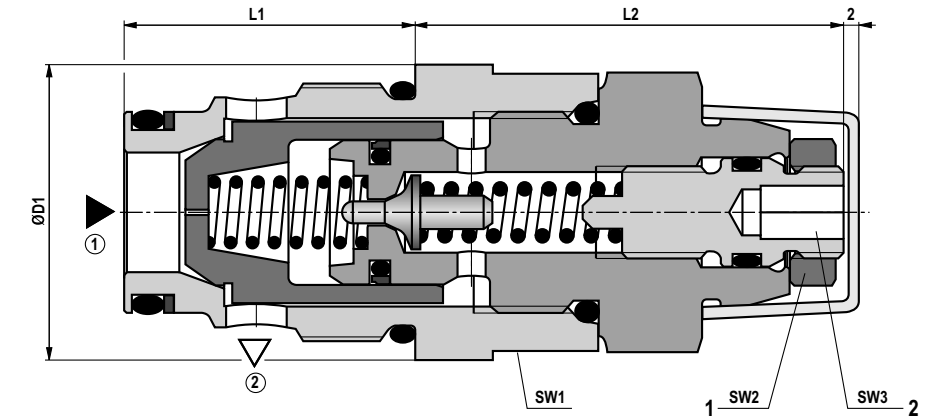


— — —
Performance limit

Unit dimensions, sections (dimensions in mm)



Type	ØD1	L1	L2	Width across flats			Tightening torque in Nm ¹⁾		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBV 16 K2-3X/100MFB	27.3	21.5	45.0	24	16	5	90	15	0.18
MHDBV 16 K2-3X/420MFB	27.3	21.5	45.0	30	16	5	90	15	0.18



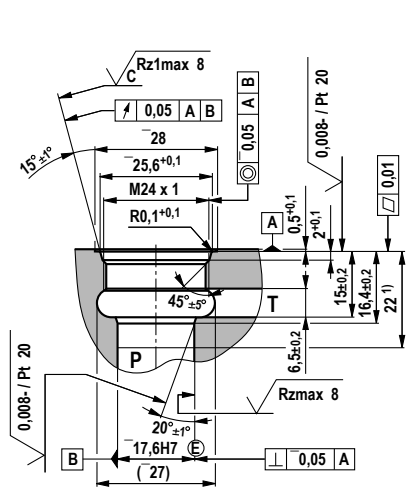
Type	ØD1	L1	L2	Width across flats			Tightening torque in Nm ¹⁾		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBV 22 K2-3X/100MFC	32.0	31.5	46.4	30	16	5	100	15	0.24
MHDBV 22 K2-3X/420MFC	32.0	31.5	46.4	30	16	5	100	15	0.24

- 1 Lock nut
2 Hexagon socket
- ① = Main port 1 (P)
② = Main port 2 (T)

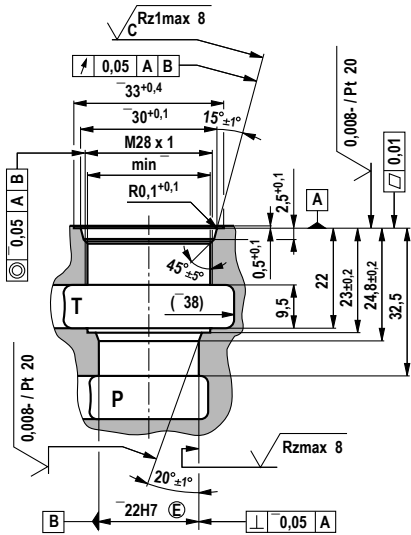
¹⁾ Friction coefficients, tightening torques and preload forces interact with each other. The friction coefficients are influenced by surface microstructure, material pairing, etc. It is thus recommended to check the screwing behavior with original components and basic application conditions.

Mounting cavities (dimensions in mm)

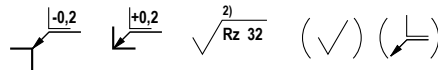
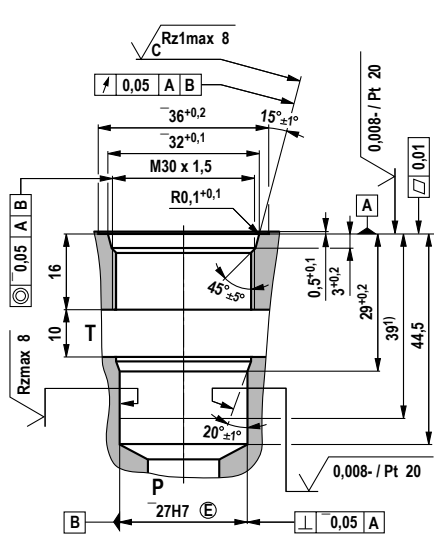
Model “FB” (M24 x 1)
(Drawing no. R901063585)



Model “FC” (M28 x 1)
(Drawing no. R901110361)



Model “LG” (M30 x 1.5)
(Drawing no. R901110408)

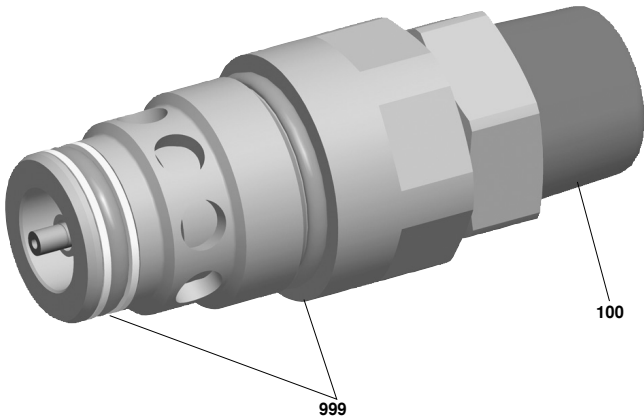


- 1) Depth of fit
2) Visual inspection
All seal ring insertion chamfers are rounded and free from burrs

Standards:

Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances	DIN 1685/1686 GTB16
General tolerances for chip-producing processes	DIN ISO 2768-mk
Tolerance	DIN ISO 8015
Surface quality	DIN EN ISO 1302

Available individual components



Item	Designation	Seal material	Material no.
100	Protective cap separately available	–	R900168151
999	Seal kit of the valve for mounting cavity "FB"	FKM	R961003378
999	Seal kit of the valve for mounting cavity "FC"	FKM	R961003380
999	Seal kit of the valve for mounting cavity "LG"	FKM	R961003397

Seal kits with NBR seals upon request.

Pressure relief and feed valve, pilot operated

RE 64602/09.11
Replaces: 03.09

1/12

Type MHDBN (High Performance)

Size 16 to 32
Component series 3X
Maximum operating pressure 420 bar
Maximum flow 400 l/min



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Features

- Cartridge valve
- For mobile applications
- Pressure ratings from 100 to 420 bar
- Versatile applications for pressure relief and feed functions

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

MH	DBN		K	-3X/						*
Mobile hydraulics										Further details in the plain text
Pressure relief and feed valve ¹⁾										Mounting cavity
Size 16			= 16							FB = M24 x 1
Size 22			= 22							FH = M24 x 1.5
Size 32			= 32							FC = M28 x 1
Cartridge valve			= K							LG = M30 x 1.5
Adjustment type										FK = M33 x 1
Setscrew with internal hexagon			= 2							LM = M36 x 1
Setscrew with metal cover			= 3							FW = 1 3/16-12 UN-2B
Component series 30 to 39				= 3X						See pages 9 to 11
(30 to 39: Unchanged installation and connection dimensions)										Seal material
Pressure rating ²⁾										M = NBR seals
100 bar				= 100						V = FKM seals
420 bar				= 420						(other seals upon request)
Without pressure adjustment, without protective cap ³⁾ = No code										Attention!
With pressure adjustment, with protective cap = ... ⁴⁾										Observe compatibility of seals with hydraulic fluid used!
Pilot oil supply internal, pilot oil return internal = No code										

¹⁾ Minimum cracking pressure see characteristic curves page 7 ("E1" – "E3").

²⁾ The values refer to the cartridge valve. In case of installation into a housing, it has to be made sure that the setting pressure of the cartridge valve does not exceed the value of the housing that might be lower!

³⁾ Protective cap separately available, Material no. **R900168151**

⁴⁾ Example: Set to 300 bar: ...420-**300**...
(Pressure adjustment with $q_{Vmax} = 10 \text{ l/min}$)

Attention!

Factory-set valves are protected by means of a protective cap. In the case of subsequent re-adjustment, the warranty will become void!

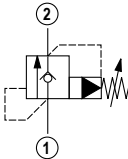
Preferred types

Type	Material number	Mounting cavity (see page 9 to 11)	Characteristic curve (see page 6 and 7)
MHDBN 16 K2-3X/100VFB	R901161659	FB	D1 / E1
MHDBN 16 K2-3X/100VFH	R901161672	FH	D1 / E1
MHDBN 16 K2-3X/420VFB	R901161947	FB	D1 / E1
MHDBN 16 K2-3X/420VFH	R901162185	FH	D1 / E1
MHDBN 22 K2-3X/100MFW	R901162201	FW	D2 / E2
MHDBN 22 K2-3X/100VFC	R901162202	FC	D2 / E2
MHDBN 22 K2-3X/420VFC	R901162378	FC	D2 / E2
MHDBN 22 K2-3X/420VLG	R901162524	LG	D2 / E2
MHDBN 32 K2-3X/100VFK	R901162658	FK	D3 / E3
MHDBN 32 K2-3X/420VFK	R901162717	FK	D3 / E3
MHDBN 32 K2-3X/420VLM	R901162838	LM	D3 / E3

Symbol

Pilot oil supply internal, pilot oil return internal version

"No code"



① = main port 1 (P)

② = main port 2 (T)

Function, sections

The pressure valve type MHDBN is a pilot operated pressure relief valve for installation in block designs. It is used for system pressure limitation. The system pressure can be set via the adjustment spindle (4).

Pressure relief function

In the initial position, the valve is closed. The pressure in main port ① acts on the spool (1). At the same time, the pressure is applied to the spring-loaded side of the spool (1) via nozzle (2) and to the pilot poppet (6). If the pressure in main port ① exceeds the value set at spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1) via nozzle (3) and channel (7) into the main port ②. The resulting pressure drop moves the spool (1) and thus opens the connection from main port ① to ② while maintaining the pressure set at spring (5). The pilot oil return is implemented internally via channel (7) into the main port ②.

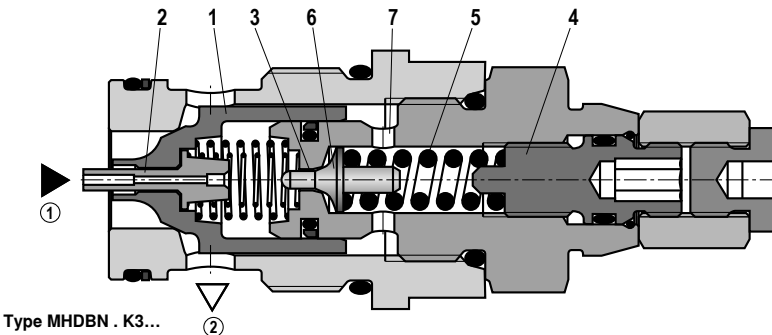
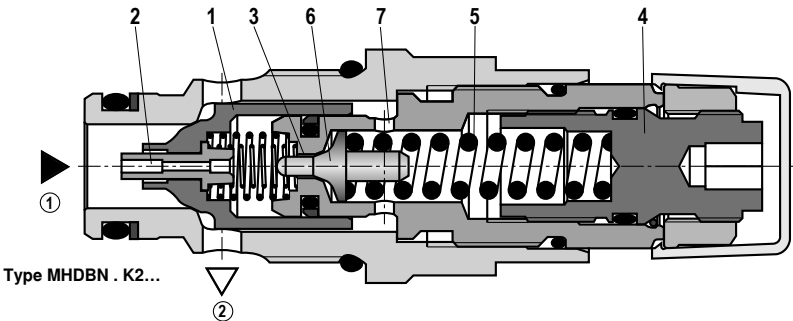
Feed function

The feed function makes up for lacking oil volumes caused, for example, by leakage when pressure valves respond or in the case of loading loads.

If the pressure at main port ① is lower than the one at main port ②, the spool (1) will be moved to the right. Hydraulic fluid flows from main port ② to main port ①.

Notice!

- The maximum operating pressure is added up from the setting pressure and counter pressure at main port ②.
- The pilot operated pressure valves are virtually leakage oil-free according to their construction.



① = main port 1 (P)

② = main port 2 (T)

Technical data (For applications outside these parameters, please consult us!)

general		
Weight	kg	See page 8
Installation position		Any
Ambient temperature range	°C	-20 to +80 (NBR seals) -20 to +80 (FKM seals)
Surface protection		Without – surface protection has to be ensured by painting the components or the whole assembly (e. g. valve with housing).

hydraulic			
Maximum operating pressure	- Main port ① (P)	bar	100; 420
	- Main port ② (T)	bar	50
Maximum flow		l/min	See characteristic curves on page 6 and 7
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 to +80 (NBR seals) -20 to +80 (FKM seals)
Viscosity range		mm²/s	10 to 380
Maximum permissible degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles			2 million

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524
Environmentally compatible	- Insoluble in water	HEES	NBR, FKM	ISO 15380
	- Soluble in water	HEPR	FKM	
Flame-resistant	- Water-free	HEPG	FKM	ISO 15380
	- Water-free	HFDU, HFDR	FKM	ISO 12922
	- Containing water	HFAS	NBR, FKM	ISO 12922
		HFC	NBR	

 Important notices on hydraulic fluids!		- Flame-resistant – containing water: Maximum pressure differential per control edge 175 bar; otherwise, increased cavitation erosion! Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!		- Environmentally compatible: When using environmentally compatible hydraulic fluids that are simultaneously zinc-soloving, zinc may accumulate in the medium (700 mg zinc per pole tube).
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!		
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.		

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.
For selecting the filters, see www.boschrexroth.com/filter.

Attention!

Under operating conditions with an operating pressure of < 30 bar and a flow of < 30 l/min, valves of another design are to be selected from our valve program.

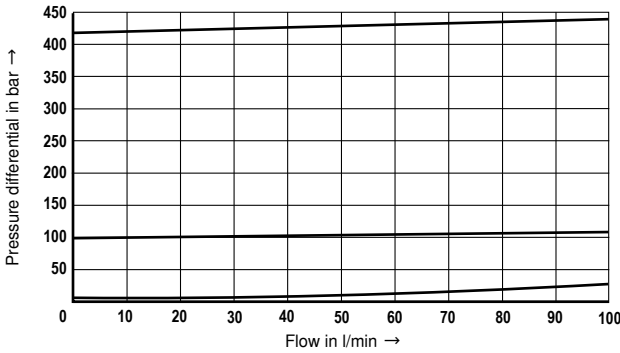
The maximum operating pressure is added up from the setting pressure and counter pressure!

 Notice!

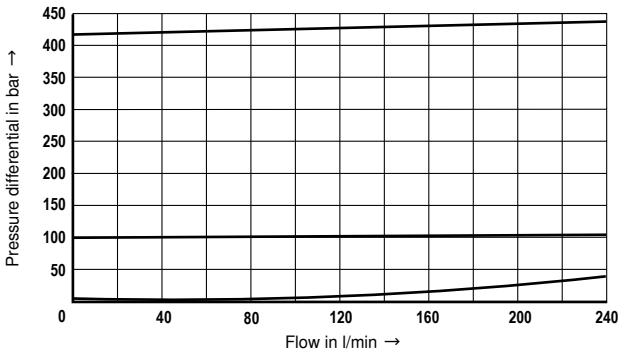
The technical data was determined at a viscosity of $\nu = 41 \text{ mm}^2/\text{s}$ (HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$).
Minimum cracking pressure see characteristic curves page 7.
Data sheet 64020-B1 "Hydraulic valves for mobile applications" is to be observed!

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

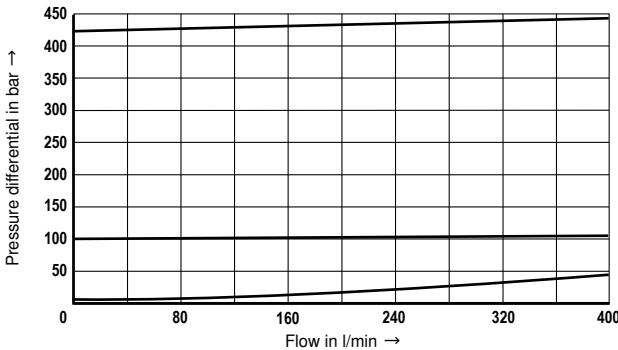
Δp - q_v -characteristic curves – "D1"



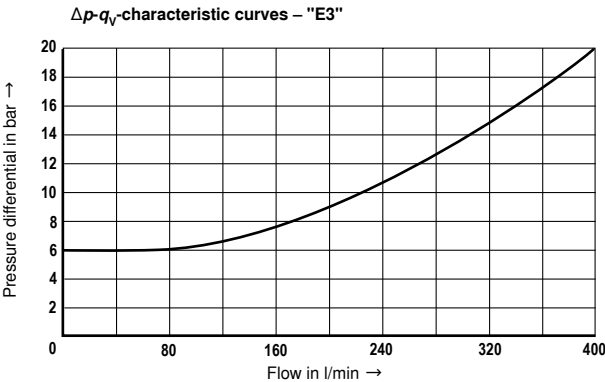
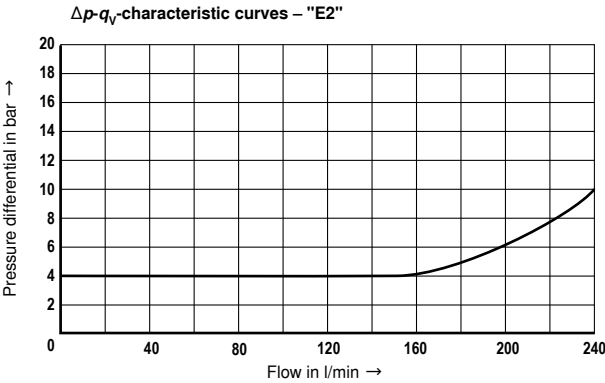
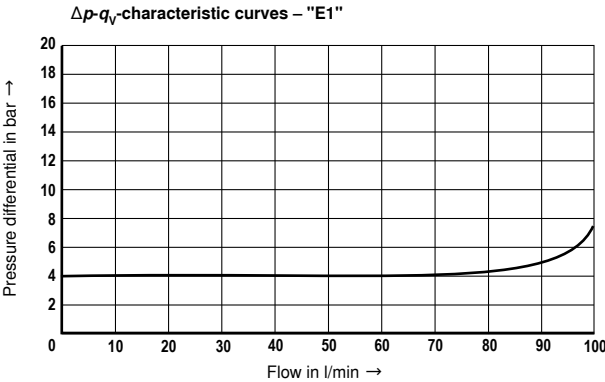
Δp - q_v -characteristic curves – "D2"



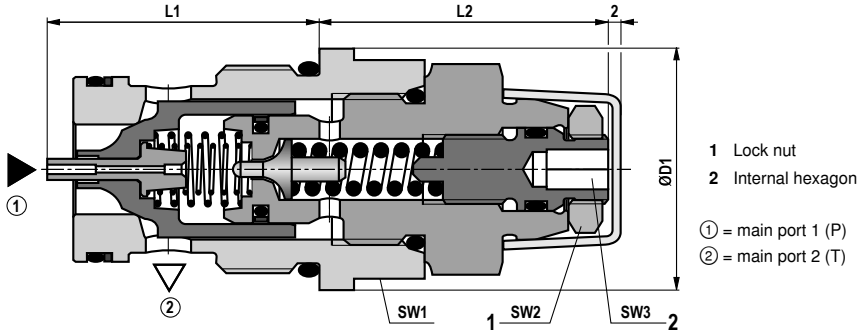
Δp - q_v -characteristic curves – "D3"



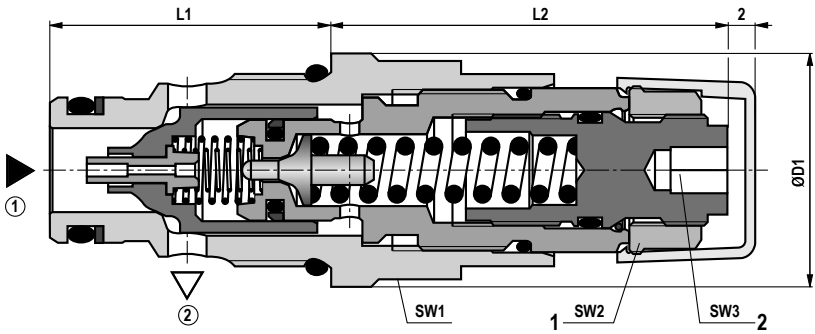
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)



Unit dimensions, sections (dimensions in mm)



Type	ØD1	L1	L2	Wrench size			Tightening torque in Nm ¹⁾		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/100VFB	27.3	24.3	45.0	24	16	5	90	15	0.17
MHDBN 16 K2-3X/420VFB	27.3	24.3	45.0	24	16	5	90	15	0.18
MHDBN 22 K2-3X/100MFW	34.0	33.7	41.8	32	16	5	100	15	0.30
MHDBN 22 K2-3X/100VFC	32.0	34.7	46.4	30	16	5	100	15	0.28
MHDBN 22 K2-3X/420VFC	32.0	34.7	46.4	30	16	5	100	15	0.28
MHDBN 32 K2-3X/100VFK	37.0	40.9	46.1	34	16	5	150	15	0.40
MHDBN 32 K2-3X/420VFK	37.0	40.9	46.1	34	16	5	150	15	0.40



Type	ØD1	L1	L2	Wrench size			Tightening torque in Nm ¹⁾		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/100VFH	29.0	35.0	46.8	24	17	5	100	20	0.21
MHDBN 16 K2-3X/420VFH	29.0	35.0	46.8	24	17	5	100	20	0.21
MHDBN 22 K2-3X/420VLG	34.5	38.5	49.2	30	17	5	100	20	0.25
MHDBN 32 K2-3X/420VLM	41.0	47.4	46.0	36	17	5	150	20	0.45

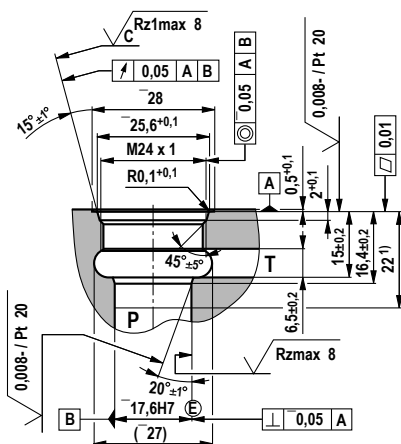
¹⁾ Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by surface microstructure, material pairing etc.

Thus, we recommend checking the mounting characteristics with genuine parts and boundary conditions.

Mounting cavities (dimensions in mm)

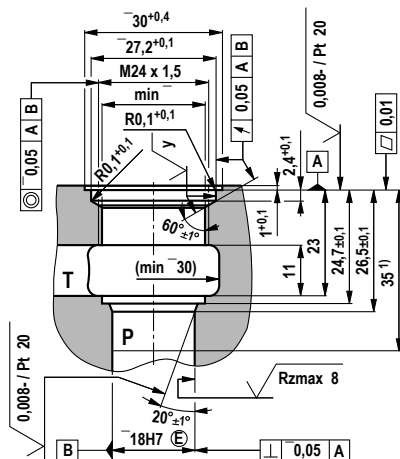
Version "FB" (M24 x 1)

(Drawing no. R901063585)



Version "FH" (M24 x 1.5)

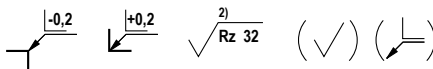
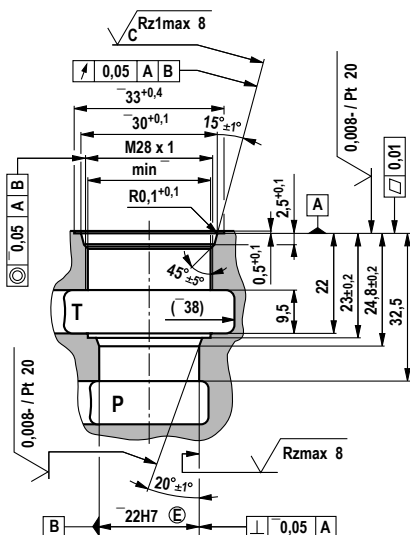
(Drawing no. R901148102)



$$\sqrt{y} = \sqrt{C^{0,008- / Pt 10}}$$

Version "FC" (M28 x 1)

(Drawing no. R901110361)



1) Depth of fit

2) Visual inspection

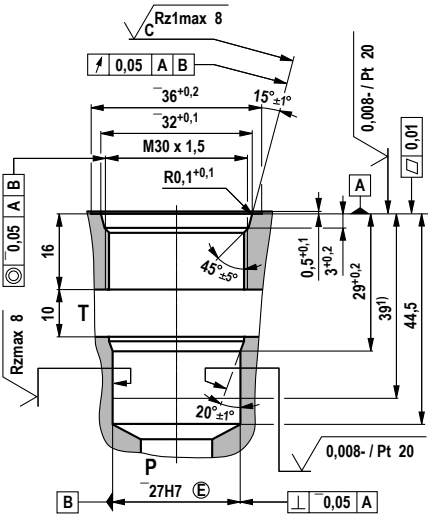
All seal ring insertion faces are rounded and free of burrs

Standards:

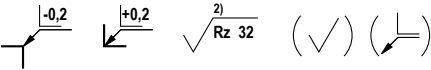
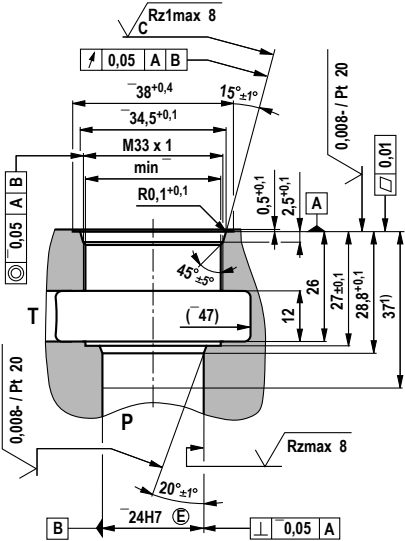
Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances	DIN 1685/1686 GTB16
General tolerance for metal-cutting procedures	DIN ISO 2768-mk
Tolerance	DIN ISO 8015
Surface condition	DIN EN ISO 1302

Mounting cavities (dimensions in mm)

Version "LG" (M30 x 1.5)
(Drawing no. R901110408)



Version "FK" (M33 x 1)
(Drawing no. R901148145)

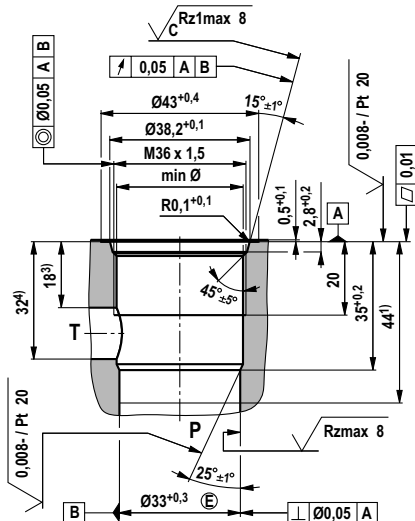


1) Depth of fit
2) Visual inspection
All seal ring insertion faces are rounded and free of burrs

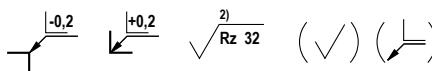
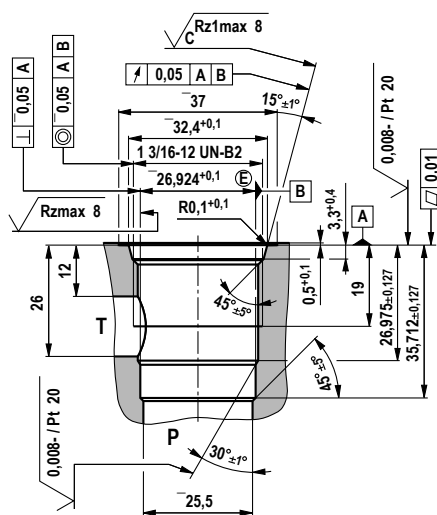
Standards:	
Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances	DIN 1685/1686 GTB16
General tolerance for metal-cutting procedures	DIN ISO 2768-mk
Tolerance	DIN ISO 8015
Surface condition	DIN EN ISO 1302

Mounting cavities (dimensions in mm)**Version "LM" (M36 x 1.5)**

(Drawing no. R901148162)

**Version "FW" (1 3/16-12 UN-2B)**

(Drawing no. R901148154)



1) Depth of fit

2) Visual inspection

3) Minimum dimension

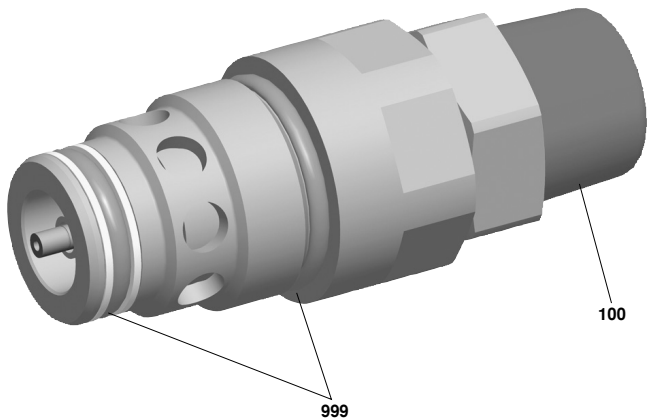
4) Maximum dimension

All seal ring insertion faces are rounded and free of burrs

Standards:

Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances	DIN 1685/1686 GTB16
General tolerance for metal-cutting procedures	DIN ISO 2768-mk
Tolerance	DIN ISO 8015
Surface condition	DIN EN ISO 1302

Available individual components



Item	Denomination	Seal material	Material no.
100	Protective cap separately available	–	R900168151
999	Seal kit of the valve for mounting cavity "FB"	FKM	R961003378
999	Seal kit of the valve for mounting cavity "FC"	FKM	R961003380
999	Seal kit of the valve for mounting cavity "FH"	FKM	R961003387
999	Seal kit of the valve for mounting cavity "FK"	FKM	R961003389
999	Seal kit of the valve for mounting cavity "FW"	FKM	R961003748
999	Seal kit of the valve for mounting cavity "LG"	FKM	R961003397
999	Seal kit of the valve for mounting cavity "LM"	FKM	R961003398

Seal kits with NBR seals upon request.

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3-way pressure reducing valve, direct operated

RE 18111-04/10.10 1/8
Replaces: 05.09

Type MHDRDB (Standard Performance)

Size 4
Component series 1X
Maximum operating pressure 420 bar
Maximum flow 15 l/min



H7386

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Characteristic curves	5
Unit dimensions	6
Mounting cavity	7
Available individual components	8

Features

- Cartridge valve
- Mounting cavity R/LA
- 2 pressure ratings, optional (35 and 40 bar)
- Versatile use for pressure reducing functions with leakage oil drain to channel T
- Integrated pressure relief function

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

MH	DR	DB	04	K	0	1X	/	V	LA	*
----	----	----	----	---	---	----	---	---	----	---

3-way pressure reducing valve,
direct operated

= DR

Integrated pressure relief function

= DB

Size 4

= 04

Cartridge valve

= K

Adjustment element

None

= 0

Component series 10 to 19
(10 to 19: unchanged installation and connection dimensions)

= 1X

Further details in clear text

LA =

Standard Performance
and mounting cavity
(see page 6)

Seal material

V =

FKM seals
(other seals on request)
Attention!
Observe compatibility of seals with
hydraulic fluid used!

Pressure rating

035 =

35 bar

040 =

40 bar
(lower pressure ratings on request)

Standard types

Pressure rating	Type	Material number
35 bar	MHDRDB 04 K0-1X/035VLA	R900641606
40 bar	MHDRDB 04 K0-1X/040VLA	R900751628

Function, section, symbol

General

Direct operated 3-way pressure reducing valves of type MHDRDB are used to reduce a system pressure. They basically consist of control spool (1), compression spring (2) and spring plate (3).

Pressure reducing function

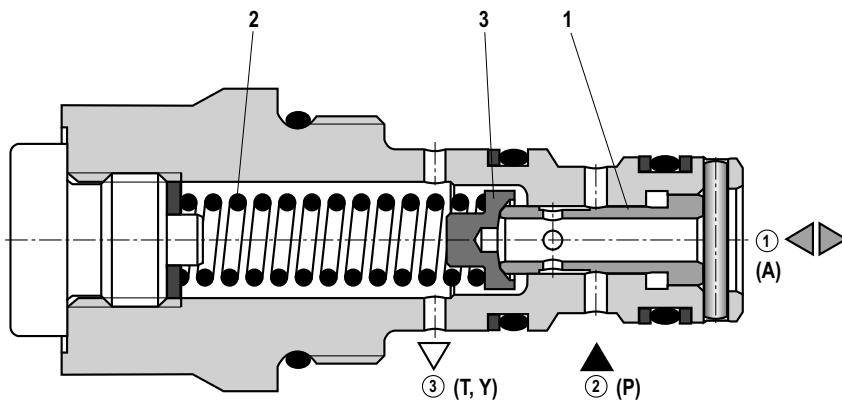
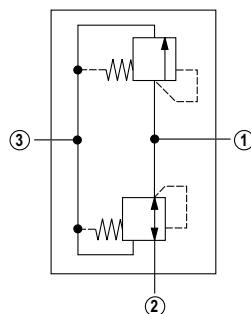
In the starting position the valve is closed. Hydraulic fluid flows from main port ② to ①. When the pressure in main port ① increases to the value preset on compression spring (2), the connection from ② to ① is closed. A further increase in the system pressure (main port ②) has no longer an influence on the pressure in main port ① (pressure-holding function). Pressure losses in main port ① (actuator) are compensated for by the valve.

Pressure relief function

When the pressure in main port ① exceeds the set value, control spool (1) is shifted against compression spring (2) and main port ① is connected to ③. An undesirable increase in pressure in main port ① is additionally prevented by lifting spring plate (3) off the control spool (1).

The pressure in main port ① increases in dependence on the inlet pressure and flow (see characteristic curves on page 5).

Symbol



- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T, Y)

Technical data (for applications outside these parameters, please consult us!)**General**

Weight	kg	0.17
Installation position		Optional
Ambient temperature range	°C	-20 to +80
Surface protection		The valves are not provided with any surface protection. Surface protection must be ensured by paint-coating of the components or the entire assembly (e.g. valve with housing).

Hydraulic

Maximum operating pressure	– main port ② (P)	bar	420
Maximum control pressure ^{1, 2)}	– main port ① (A)	bar	35, 40
Maximum tank pressure ¹⁾	– main port ③ (T, Y)	bar	30
Maximum flow		l/min	15
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51524; fast bio-degradable hydraulic fluids to VDMT 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids on request
Hydraulic fluid temperature range		°C	-20 to +80
Viscosity range		mm ² /s	10 to 800
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)			Class 20/18/15 ³⁾
Load cycles			2 million

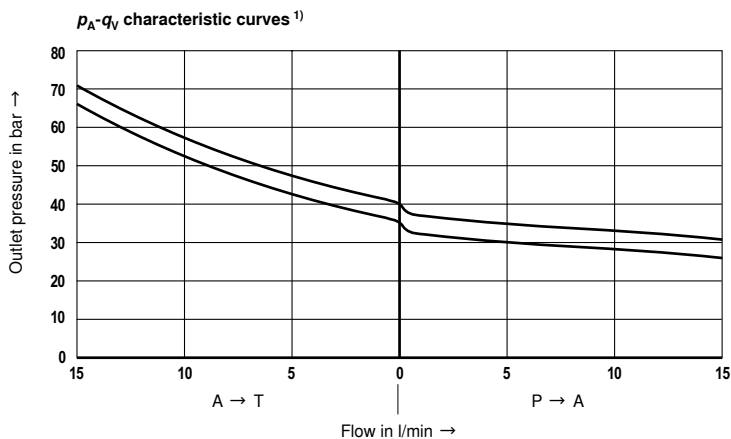
¹⁾ The tank pressure (main port ③) adds to the set control pressure (main port ①).

²⁾ The control pressure is checked and adjusted with zero flow.

³⁾ The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of the filters see
www.boschrexroth.com/filter.

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

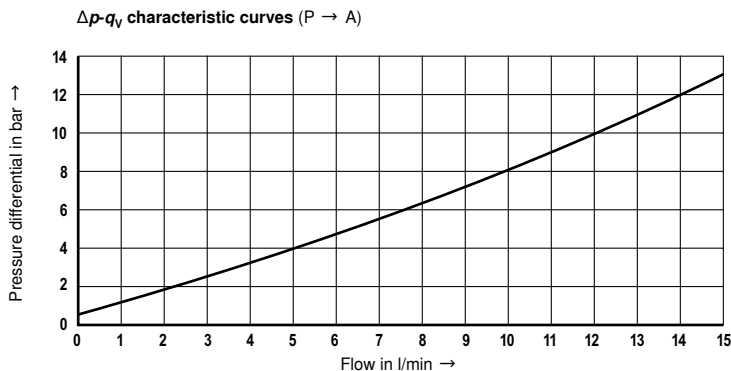


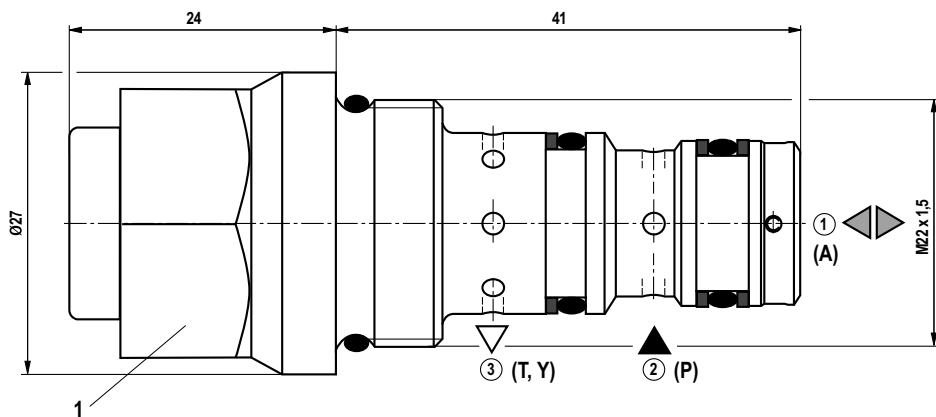
¹⁾ The characteristic curves for the pressure relief function are valid at an outlet pressure of 0 bar within the entire flow range!



Note!

Beginning of the pressure relief function at approx. +10% above the pressure rating.

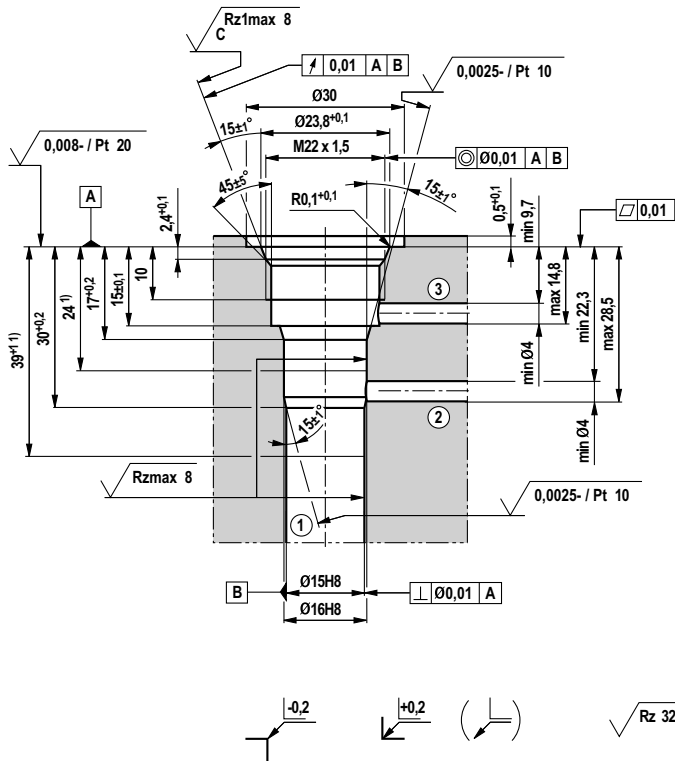


Unit dimensions (dimensions in mm)

- 1 Hexagon 24 A/F,
tightening torque $M_t = 60 \pm 5$ Nm

Screw-in hole see page 7.

Mounting cavity R/LA: 3 main ports, thread M22 x 1.5 (dimensions in mm)



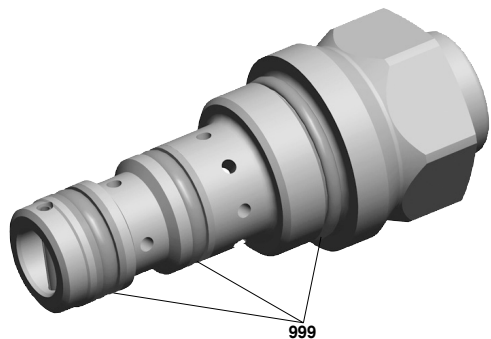
- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T, Y)

1) Depth of fit

Standards:

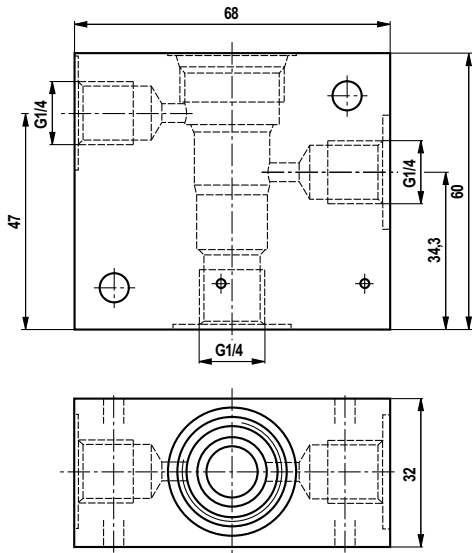
Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances for chip-producing processes	DIN ISO 2768-mK
Tolerance	DIN ISO 8015
Surface quality	DIN EN ISO 1302

Available individual components



Item	Designation	Material no.
999	Valve seal kit	R900870592
	Housing FTDRE 4 G10/01 G1/4, M22X1.5 (see below) ¹⁾	R900862813

¹⁾ Maximum operating pressure 350 bar



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Shuttle valve

RE 18205/07.12
Replaces: 05.09

1/6

Type MHSU

Size 2 and 3
Component series 1X
Maximum operating pressure 420 bar



H7385

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Features

- Cartridge valve
- For mobile applications
- Pressure rating 420 bar
- Available in 2 sizes (2 and 3)

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

MH

SU

K

A

1X/420

*

Mobile hydraulics

Shuttle valve

Size 2 = 2

Size 3 = 3

Cartridge valve = K

with ball = A

Further details in the plain text

No code = without orifice

B08 = ¹⁾ Orifice Ø 0.8 mm

420 = Pressure rating 420 bar

1X = Component series 10 to 19
(10 to 19: unchanged installation and connection dimensions)

¹⁾ With size 2 available.

Standard types

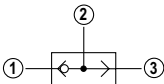
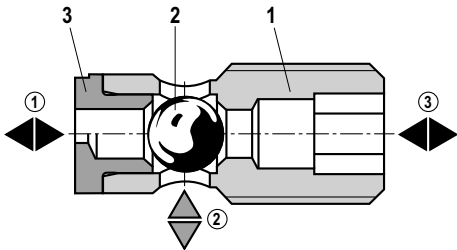
Type	Material number
MHSU 2 KA1X/420	R900541374
MHSU 2 KA1X/420 B08	R900545233
MHSU 3 KA1X/420	R901071225

Function, section, symbol

The shuttle valve type MHSU is an isolator valve with two inputs ① and ③ as well as one output ②.

It basically comprises housing (1), ball (2) and pressed-in valve seat with/without orifice (3).

The input with the higher pressure is automatically connected with the joint output ② while the other input is blocked.



- ① = Input "A"
- ② = Output "B"
- ③ = Input "C"

Technical data (For applications outside these parameters, please consult us!)

general			
Size	NG	2	3
Weight	g	approx. 5	approx. 9
Installation position	Any		
Ambient temperature range	°C	-20 to +80	
Surface protection	Without		

hydraulic			
Maximum operating pressure	bar	420	
Maximum flow	l/min	see characteristic curves page 4	
Hydraulic fluid		see table below	
Hydraulic fluid temperature range	°C	-30 to +80	
Viscosity range	mm²/s	10 to 380	
Maximum permitted degree of contamination of the hydraulic fluid – cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾	
Load cycles		2 Mio.	
Leakage	Pressure drop from ① to ②	virtually leak-free	
	over thread from ③ to ②	Q _L ≤ 15 cm³/min (at 100 bar and v=32 mm²/s ± 5 mm²/s)	

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	VDMA 24568
	– Soluble in water	HEPG	

 Important information on hydraulic fluids!

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.
- **Bio-degradable:** When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.

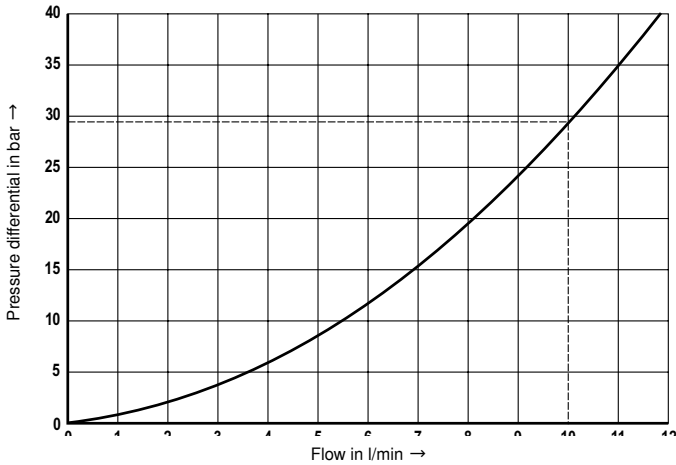
¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Efficient filtration prevents malfunctions and at the same time prolongs the service life of components.
For the selection of the filters, see www.boschrexroth.com/filter

 Note!

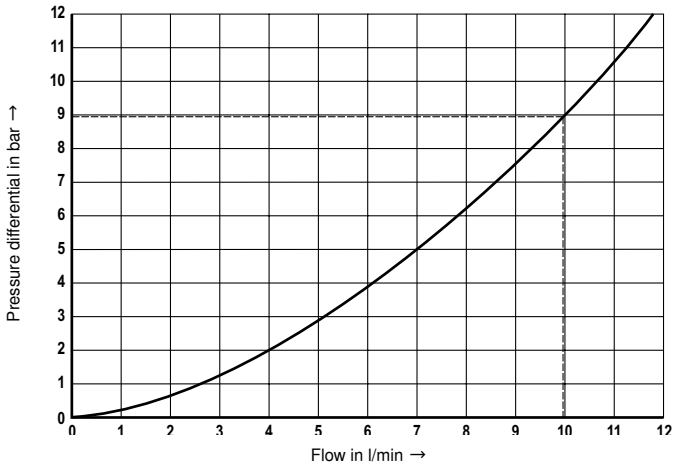
The technical data was determined with a viscosity of $v = 41 \text{ mm}^2/\text{s}$ (HLP46, $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$).
The following documentation must be observed:
64020-B1 "Hydraulic valves for mobile applications"

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

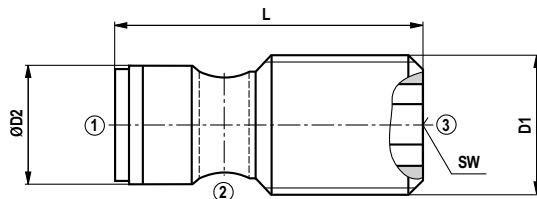
$\Delta p\text{-}q_v$ characteristic curves – size 2



$\Delta p\text{-}q_v$ characteristic curves – size 3



Unit dimensions (dimensions in mm)



Size	L	D1	ØD2	SW	Tightening torque in Nm ¹⁾
2	20	M8 x 1	6,4	4	7
3	22	M10 x 1	8	5	10

① = Input "A"

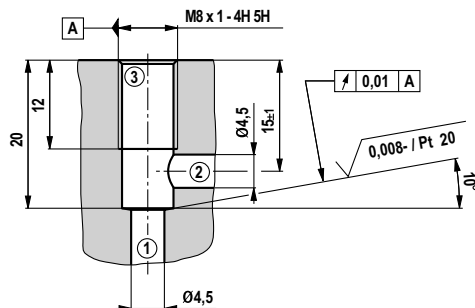
② = Output "B"

③ = Input "C"

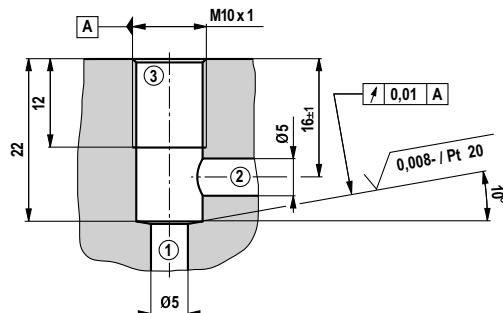
¹⁾ The specified tightening torques are reference values. Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc. Thus, we recommend checking the mounting characteristics with genuine parts and boundary conditions.

Mounting cavities (dimensions in mm)

Size 2

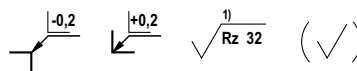


Size 3

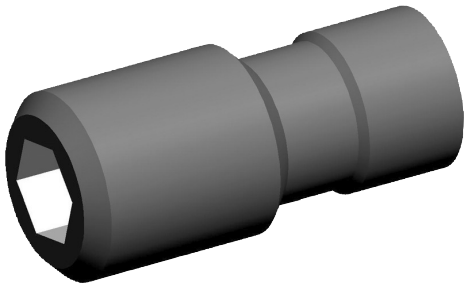


Standards:

Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances for metal-cutting procedures	DIN ISO 2768-mK
Tolerance	DIN ISO 8015
Surface quality	DIN EN ISO 1302

¹⁾ Visual inspection

Available individual components



Description	Unit size	Material number	Flow	Weight in g	M _A in Nm + 10 %
PLUG SCREW MHSU 2 A/B/C	2	R901221771	① / ② / ③	5,2	7
PLUG SCREW MHSU 3 A/B/C	3	R901149008		8,9	10
PLUG SCREW MHSU 2 A-B/C	2	R901221774	① – ② / ③	4,8	7
PLUG SCREW MHSU 3 A-B/C	3	R901081617		7,8	10
PLUG SCREW MHSU 2 A/B-C	2	R901221780	① / ② – ③	5,0	7
PLUG SCREW MHSU 3 A/B-C	3	R901081616		8,1	10

- ① = Input “A”
- ② = Output “B”
- ③ = Input “C”

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2-way flow control valve

RE 18351/04.11

1/8

Type MH2FR

Size 4
Component series 2X
Maximum operating pressure 420 bar
Maximum flow 1.2 l/min



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Features

- Cartridge valve
- Mounting cavity R/MH2FR04K
- Little start-up jump

Ordering code

MH2FR

4

K

A-2X

*

2-way flow control valve

Size 4

Cartridge valve

Pump connection in channel A

Component series 20 to 29
(20 to 29: Unchanged installation and connection dimensions)

Flow

up to 0.4 l/min

up to 0.7 l/min

up to 1.2 l/min

= 4

= K

= A

= 2X

= 0.4

= 0.7

= 1.2

Further details in the plain text

no code =

V =

Seal material

NBR seals

FKM seals

(other seals upon request)

Attention!

Observe compatibility of seals

with hydraulic fluid used!

Standard types

Type	Material number
MH2FR 04 KA2X/0,4V	R900753499
MH2FR 04 KA2X/0,7V	R901047887
MH2FR 04 KA2X/1,2V	R901137792

Symbols (detailed and simplified)



Function, section

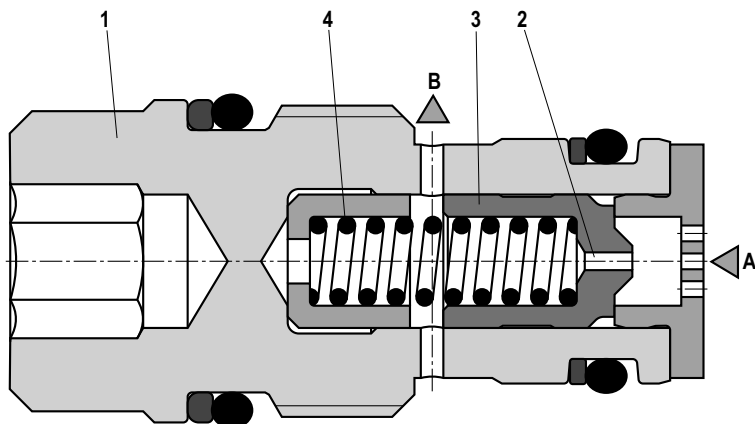
The valve type MH2FR is a 2-way flow control valve for installation in block constructions. It is used for keeping a flow constant, independent of pressure and temperature.

The valve basically comprises of a housing (1), a throttling point (2) and a pressure compensator (3) with compression spring (4).

In order to keep the flow in channel B constant, independent of the pressure, a pressure compensator (3) is fitted downstream of the throttling point (2).

When fluid flows through the valve in the flow direction from A to B, the pressure acting in port A applies a force to the pressure compensator (3). The pressure compensator moves into the control position until the forces balance. If the pressure in channel A or B changes, the pressure compensator (3) keeps on controlling and in this way keeps the pressure drop constant across the throttling point (2). The constant pressure drop and the fixed throttling point (2) cross-section result in a constant flow.

In the direction of flow from B to A, the return flow via the throttling point (2) is free.



Technical Data (For applications outside these parameters, please consult us!)

general		
Weight	kg	0.30
Installation position		Any
Ambient temperature range	°C	–30 to +80 (NBR seals) –15 to +80 (FKM seals)
Surface protection		Without - surface protection has to be ensured by painting the components or the whole assembly (e.g. valve with housing).

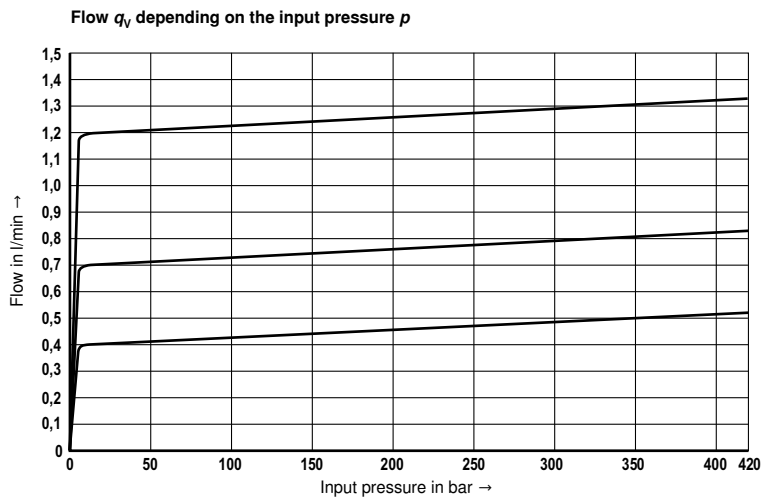
hydraulic		
Maximum operating pressure	bar	420
Maximum flow	l/min	1.2
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	–30 to +80 (NBR seals) –15 to +80 (FKM seals)
Viscosity range	mm²/s	10 to 800
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HEES HEPR	NBR, FKM FKM	ISO 15380
	– Soluble in water	HEPG	FKM	ISO 15380
Flame-resistant	– Water-free	HFDD, HFDR	FKM	ISO 12922
	– Water-containing	HFAS	NBR, FKM	ISO 12922
		HFC	NBR	

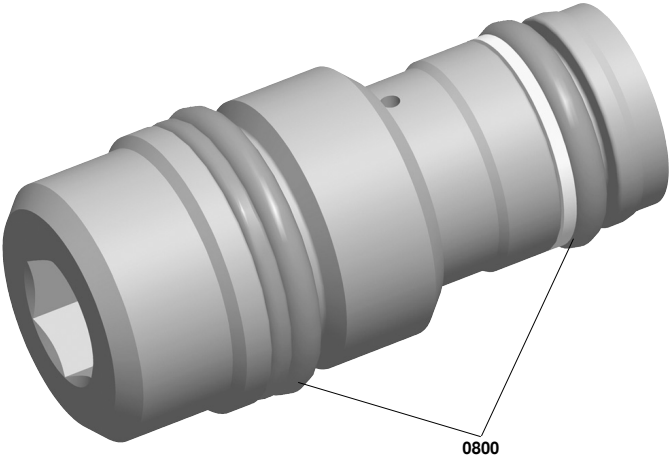
	Important information on hydraulic fluids!	– Flame-resistant – water-containing: Maximum pressure difference per control edge 175 bar, otherwise, increased cavitation erosion! Tank pre-loading < 1 bar or > 20 % of the pressure difference. The pressure peaks should not exceed the maximum operating pressures!
– For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! – There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! – The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.		

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

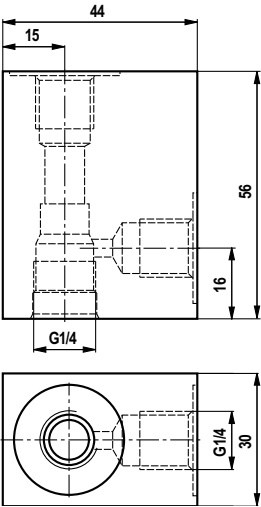
For the selection of the filters see
www.boschrexroth.com/filter.

Characteristic curves (measured with HLP46, $\vartheta_{\text{oil}} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Available individual components



Item	Denomination	Material no.
0800	DICHTUNGSSATZ MH2FR 04 K1X/2X/V	R900723359
	Housing MH1DBD 4 G10/EV01 G1/4, M14 x 1 (see below)	R900835780



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2-way logic element, direct operated

RE 64586/05.08
Replaces: 02.07

1/8

Type MH2DAD (Standard Performance)

Size 3
Component series 1X
Maximum operating pressure 420 bar
Maximum flow 2.5 l/min



H4637

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Features

- As cartridge valve
- With pressure shut-off function for load-sensing pressure
- For threaded connection
- Mounting cavity R/MH2DAD
- Various pressure ranges, optional

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

MH2DAD

03

-1X/

*

2-way logic element,
direct operated

Size 3

As cartridge valve

For threaded connection

Component series 10 to 19
(10 to 19: unchanged installation and connection dimensions)

Pressure range

30 bar (on request)

100 bar

300 bar

420 bar

= 03

= K2

= G2

= 1X

= 030

= 100

= 300

= 420

Further details in clear text

No code =

02 =

Block installation

Threaded connection

Seal material

NBR seals

FKM seals

(other seals on request)

⚠ Attention!

Observe compatibility of seals
with hydraulic fluid used!

M =

V =

No code =

Without pressure pre-setting

With pressure pre-setting

1)

Example:

- pre-set to 50 bar: ...-50

Standard types

Type	Material number	Type	Material number
MH2DAD 03 K2-1X/100M	R900521594	MH2DAD 03 G2-1X/100M02	R900571284
MH2DAD 03 K2-1X/300M	R900882730	MH2DAD 03 G2-1X/300M02	R900979194
MH2DAD 03 K2-1X/420M	R900905541	MH2DAD 03 G2-1X/420M02	R900906304

Further standard types and components can be found in the EPS (standard price list).

Function, section, symbol

General

Logic elements with pressure shut-off function of type MH2DAD reduce the load-sensing pressure (in short: LS pressure) in proportion to an external pressure. As the pilot pressure increases, the LS pressure is proportionally reduced from $p_{\max}$ to zero.

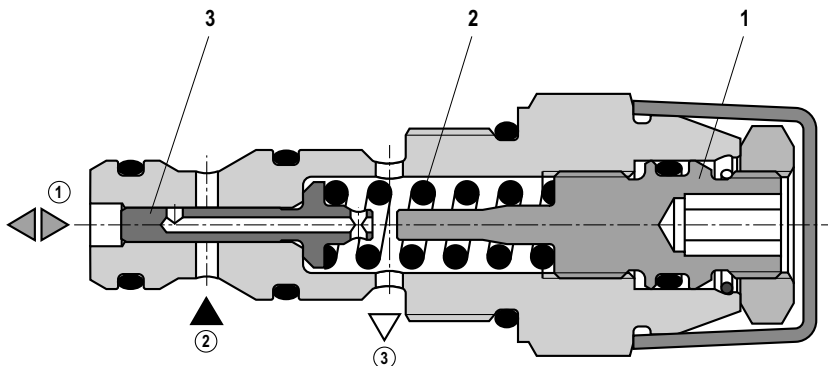
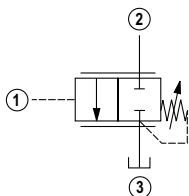
For the application of the valves, see circuit example on page 7.

The spring force is adjusted by means of the adjustment element (1) (for pressure adjustment, see page 4). The valves basically consist of adjustment element (1), control spring (2) and control spool (3).

Function

In the starting position, the valve is closed. When the pressure in main port ① (P_{st}) increases to the value set by means of adjustment element (1), control spool (3) opens the connection from main port ② (P) to main port ③ (T, Y). The pressure in port ② (P) is reduced in proportion to the pressure increase in main port ① (P_{st}).

Symbol



- ① = Main port 1 (P_{st})
- ② = Main port 2 (P)
- ③ = Main port 3 (T, Y)

Technical data (for applications outside these parameters, please consult us!)**General**

Weight	– Cartridge valve	kg	0.1
	– Housing (without valve)	kg	0.6
Installation position			Optional
Ambient temperature range		°C	–20 to +80
Surface protection			The valves are not provided with surface protection. Surface protection must be ensured by painting the components or the entire assembly (e.g. valve with housing).

Hydraulic

Maximum operating pressure	– Main port ① (P_{st})	bar	420
	– Main port ② (P)	bar	350
	– Main port ③ (T, Y)	bar	50
Maximum pressure setting ¹⁾	– Version 030	bar	30
	– Version 100	bar	100
	– Version 300	bar	300
	– Version 420	bar	420
Maximaler Volumenstrom		l/min	2.5
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51524 ²⁾ ; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape-seed oil) ²⁾ ; HEPG (polyglycols) ³⁾ ; HEES (synthetic esters) ³⁾ ; other hydraulic fluids on enquiry
Hydraulic fluid temperature range		°C	–30 to +80 (NBR seals) –20 to +80 (FKM seals)
Viscosity range		mm ² /s	10 to 380
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)			Class 20/18/15 ⁴⁾
Load cycles			2 million

¹⁾ The pressure range must be selected so that the maximum spring force is greater than the maximum pilot pressure in port P_{st} .
(Example: Pilot pressure p_{st} 300 bar → pressure range 420 bar)

²⁾ Suitable for NBR and FKM seals

³⁾ Suitable only for FKM seals

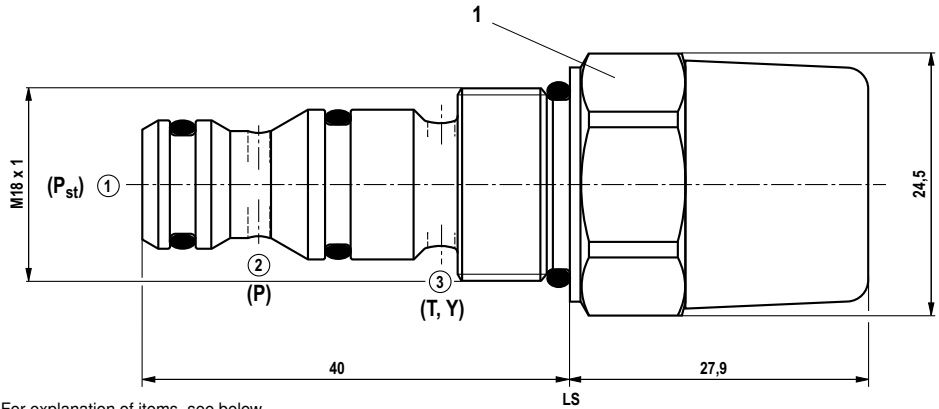
⁴⁾ The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

Adjustment of the pressure setting

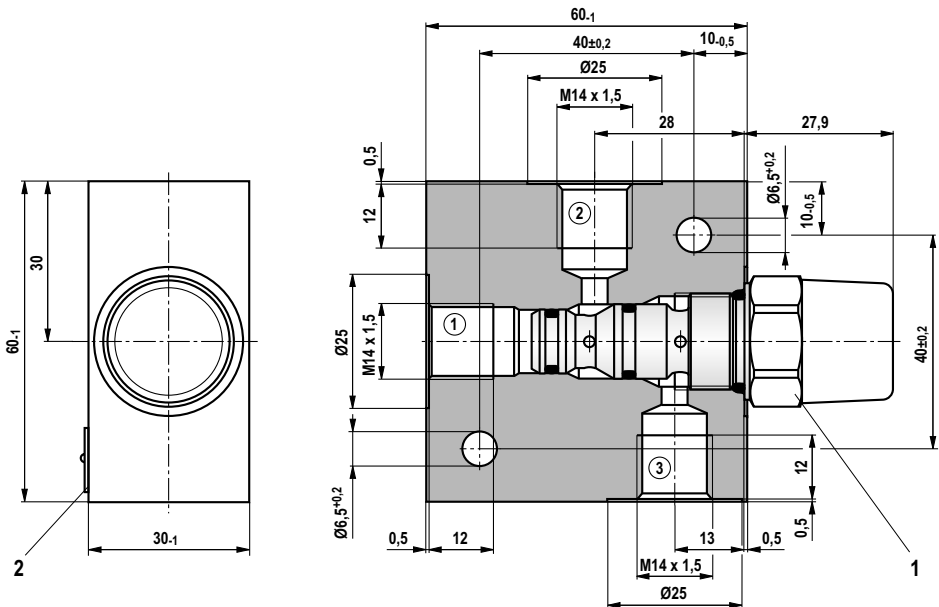
	bar/turns
Version 030	on request
Version 100	60
Version 300	160
Version 420	290

Unit dimensions: Cartridge valve (dimensions in mm)



For explanation of items, see below

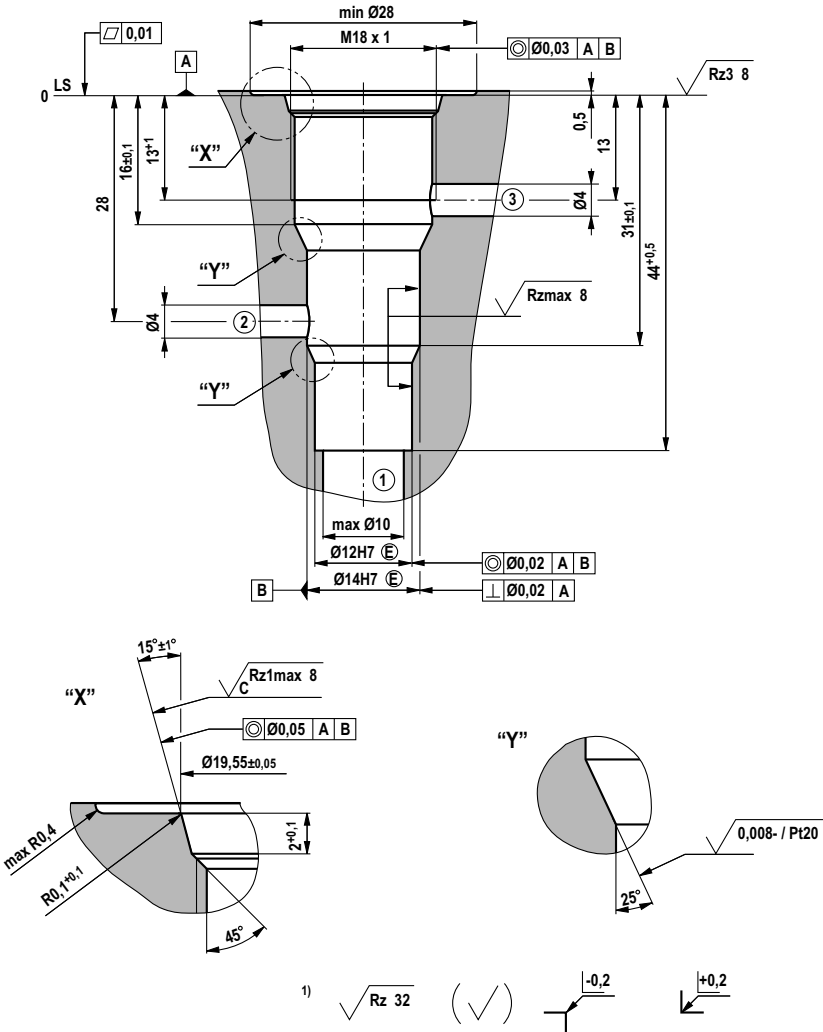
Unit dimensions: Threaded connection (dimensions in mm)



- 1 22 A/F, tightening torque $M_T = 60 \pm 10$ Nm
- 2 Nameplate

- ① = Main port 1 (P_{st})
 ② = Main port 2 (P)
 ③ = Main port 3 (T, Y)
LS = Location shoulder

Mounting cavity R/MH2DAD.K; 3 main ports; thread M18 x 1 (dimensions in mm)



1) All seal ring insertion faces are rounded and free from burrs

Tolerance for all angles $\pm 0,5^\circ$

① = Main port 1 (P_{st})

② = Main port 2 (P)

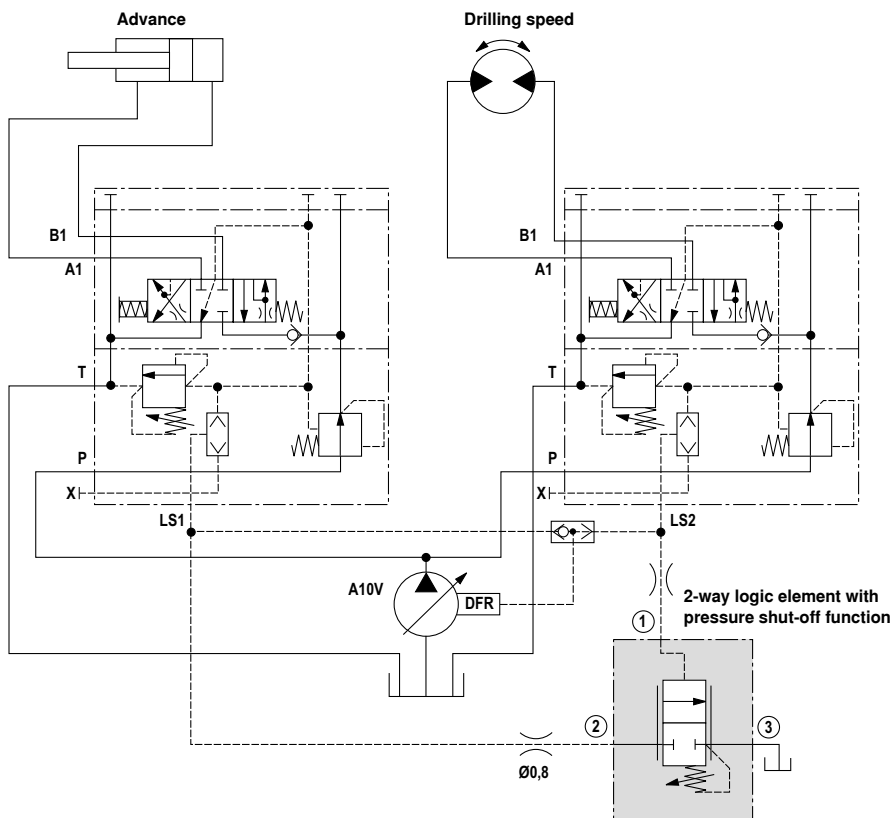
③ = Main port 3 (T, Y)

LS = Location shoulder

Circuit example

⚠ Attention!

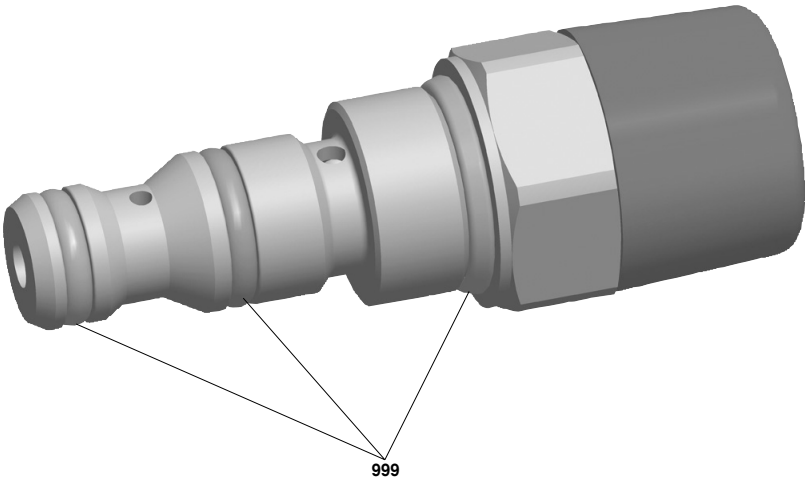
No system responsibility on the part of Bosch Rexroth can be derived from this circuit example!



- ① = Main port 1 (P_{st})
 ② = Main port 2 (P)
 ③ = Main port 3 (T, Y)

This circuit example is suitable for an automatic anti-jamming system of a drill rig. When the drill rod jams, the rotational pressure increases and valve type MH2DAD reduces (limits) the LS pressure of the advance valve accordingly and the flow via the 2-way pressure compensator.

Available individual components



Item	Designation	Material no.
999	DICHTUNGSSATZ R/MH2DAD.K1X/..	R961003368
	GEHAEUSE MH2DAD 03 G10/02 M14X1,5	R900826055

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High Pressure Cartridge Valves

Solenoid on-off

Designation	Description	Cavity	Data sheet	Pages
2/2 directional poppet valve, direct operated with solenoid actuation	KSDE U/R 8	T-8A	RE 18136-12	947
2/2 directional seat valve, direct operated with solenoid actuation	KSDE 0	Special	RE 18136-23	957
2/2 directional seat valve, direct operated with solenoid actuation	KSDE U/R 1	T-13A	RE 18136-20	965
3/2 directional seat valve, direct operated with solenoid actuation	KSDE U/R 1	T-11A	RE 18136-21	973
2/2 directional spool valve, direct operated with solenoid actuation	KKDER 8	T-8A	RE 18136-08	981
3/2 directional spool valve, direct operated with solenoid actuation	KKDER 8	T-9A	RE 18136-09	991
2/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-13A	RE 18136-06	1001
3/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-11A	RE 18136-04	1011
4/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-31A	RE 18136-05	1021
5/3 directional spool valve, direct operated with solenoid actuation	VEDS-10A-53	Size 10	RE 18158	1031

2/2 directional seat valve, direct operated with solenoid actuation

RE 18136-12/10.11 1/10
Replaces: 06.08

Type KSDE (High Performance)

Component size 8
Component series B
Maximum operating pressure 500 bar
Maximum flow 5 l/min



H7077

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Limits of performance	6
Unit dimensions	7
Mounting cavity	8
Available individual components	9

Features

- Direct operated directional seat valve with solenoid actuation, tight on both sides
- Mounting cavity R/T-8A
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

Ordering code (valve without coil) ¹⁾

KSDE

8

B / H

V

*

Directional seat valve, direct operated, electrically operated

Maximum operating pressure 500 bar = U

Maximum operating pressure 350 bar = R

Component size = 8

2 main ports

②

①

"R" (350 bar)

"U" (500 bar)

"P" (350 bar)

"P" (500 bar)

"N" (350 bar)

"N" (500 bar)

Further details in the plain text

Seal material

FKM seals

(other seals upon request)

Attention!

Observe compatibility of the seal with the hydraulic fluid used!

V =

N0 = Without manual override

N9 = With concealed manual override

N11 = With screwable manual override (operation by knurled screw)

H =

High-performance and mounting cavity R/T-8A (see page 8)

B =

Component series

Valve types (without coil) ¹⁾

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
N	KSDER8NB/HN0V	R901085000	N	KSDEU8NB/HN0V	R901085007
	KSDER8NB/HN11V	R901207100	P	KSDEU8PB/HN0V	R901085009
P	KSDER8PB/HN0V	R901085005			
	KSDER8PB/HN9V	R901207098			

Available coils (separate order) ¹⁾

Direct voltage DC ⁴⁾	Material no. for coil with connector ³⁾		
	"K4"	"K40"	"C4"
03pol (2+PE) DIN EN 175301-803			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil on request

²⁾ Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code **"N9"**!

³⁾ Mating connectors (separate order), see data sheet 08006

⁴⁾ Other voltages upon request

948

Function, section, symbols

General

The 2/2 directional seat valves are direct operated, pressure-compensated cartridge valves. They basically comprises of screw-in section (1), solenoid (4) as well as closing element (3) and compression spring (2).

Function

The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350/500 bar (see page 4).

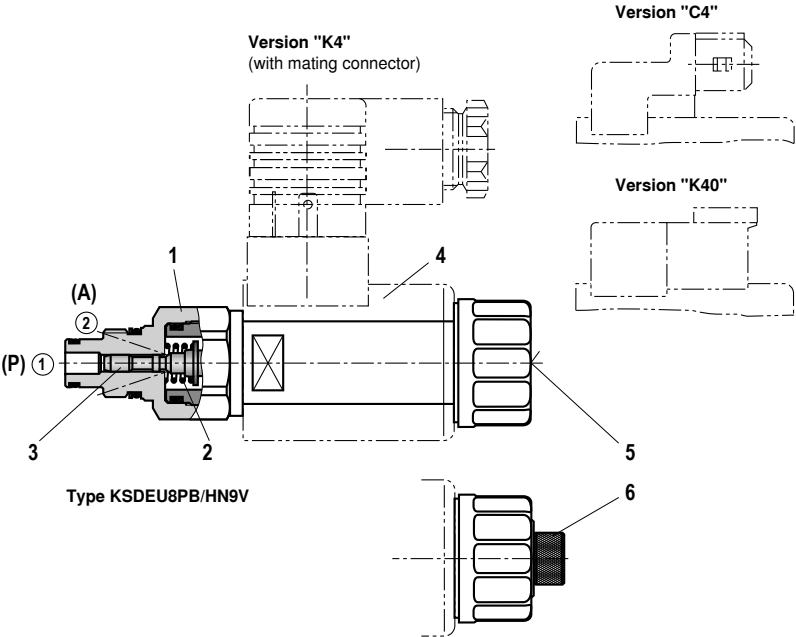
Attention!

Flow is only admissible in the direction of the arrow (see symbols)! With version "U" (operating pressure 500 bar), main port ① must be connected with pump connection P!

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (4), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (5) or in screwable version "N11" (6) (see page 2).

Version "R" (350 bar)		Version "U" (500 bar)	
Symbol "N" Normally closed	Symbol "P" Normally open	Symbol "N" Normally closed	Symbol "P" Normally open



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure	– Version "U"	bar	500 (at all ports if $P \geq A$; for design reasons)
	– Version "R"	bar	350 (at all ports)
Maximum flow	– Version "U"	l/min	3 (see limits of performance page 6)
	– Version "R"	l/min	5 (see limits of performance page 6)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles	– Version "R" (350 bar)		10 million
	– Version "U" (500 bar)		5 million

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLDP	FKM	DIN 51524
Environmentally compatible	– Insoluble in water HETG	FKM	ISO 15380
	– Soluble in water HEES	FKM	
Flame-resistant	– Water-free HEPG	FKM	ISO 15380
	– Water-free HFUD, HFDR	FKM	ISO 12922
	– Water-containing HFAS	FKM	ISO 12922

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.

- **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion!
Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
- **Environmentally compatible:** When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)**electric**

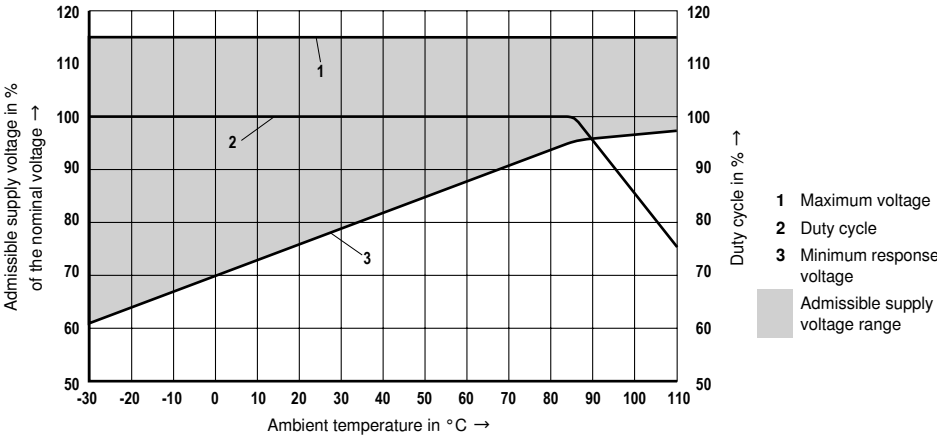
Voltage type		Direct voltage
Supply voltage ²⁾	V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curves page 6
Power consumption	W	22
Duty cycle	%	See characteristic curves page 6
Maximum coil temperature ³⁾	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON (1 → 2)	ms ≤ 80
	– OFF (2 → 1)	ms ≤ 80
Maximum switching frequency	– Version "R"	1/h 9000
	– Version "U"	1/h 3600
Type of protection according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"	IP 65 with mating connector mounted and locked
	– Version "C4"	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version "K40"	IP 69K with mating connector mounted and locked

²⁾ Other voltages upon request

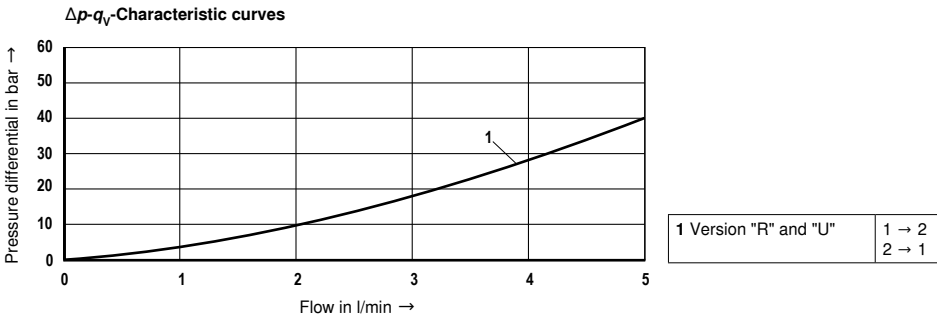
³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

With the electrical connection "K4", the protective earthing conductor (PE $\downarrow$) must be connected correctly.

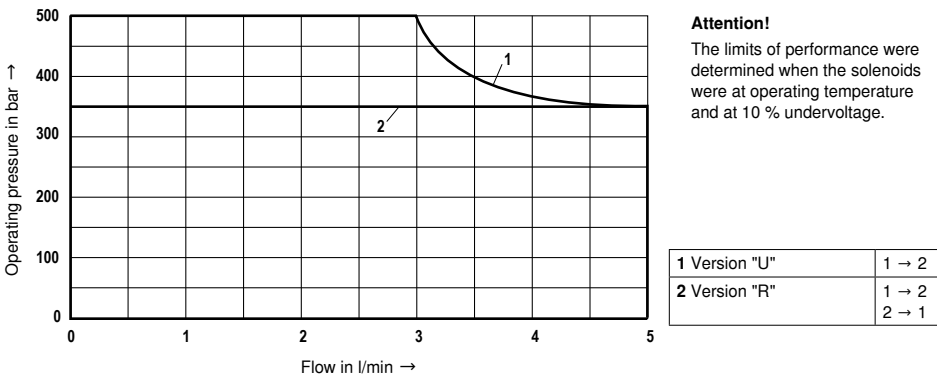
Voltage tolerance against ambient temperature; duty cycle



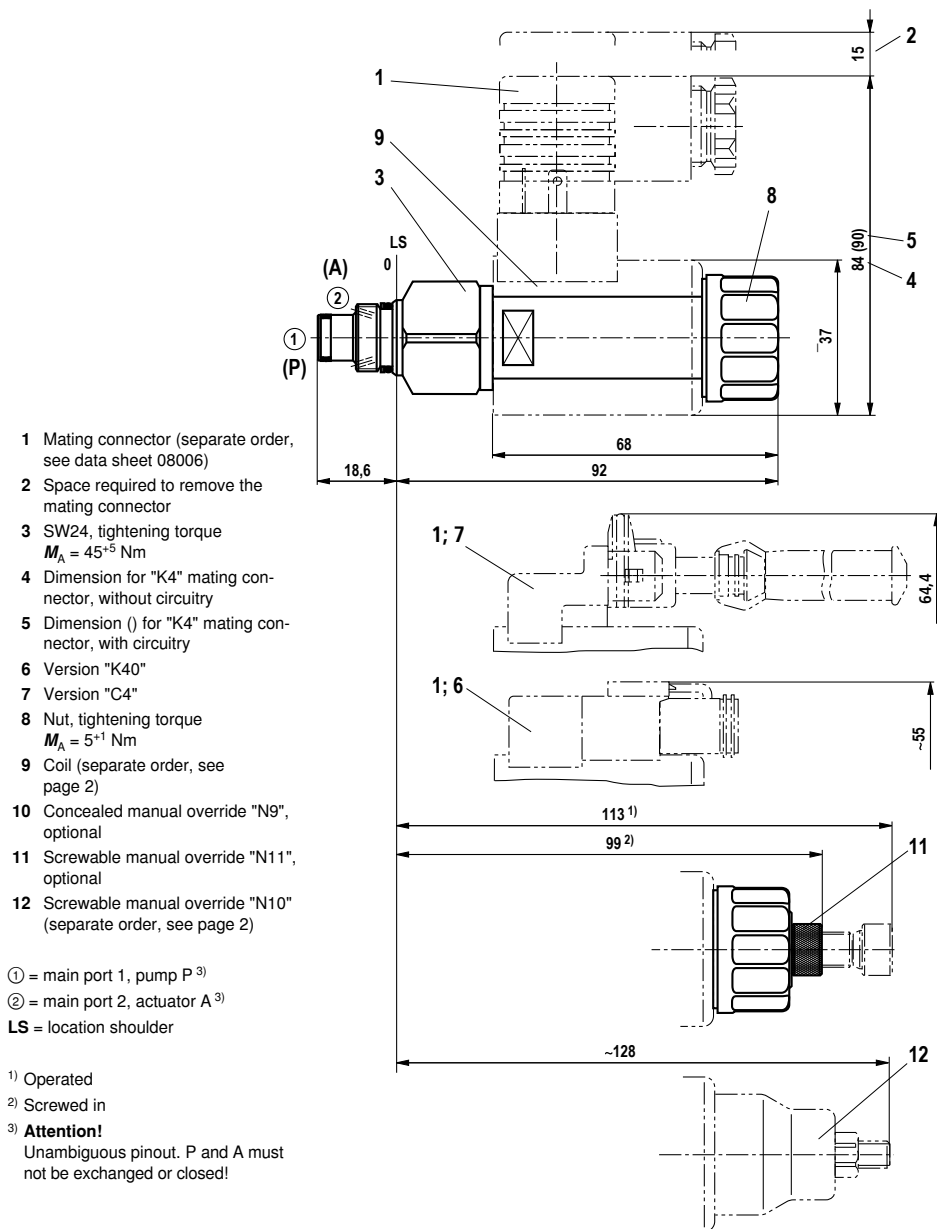
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 24 V coil)



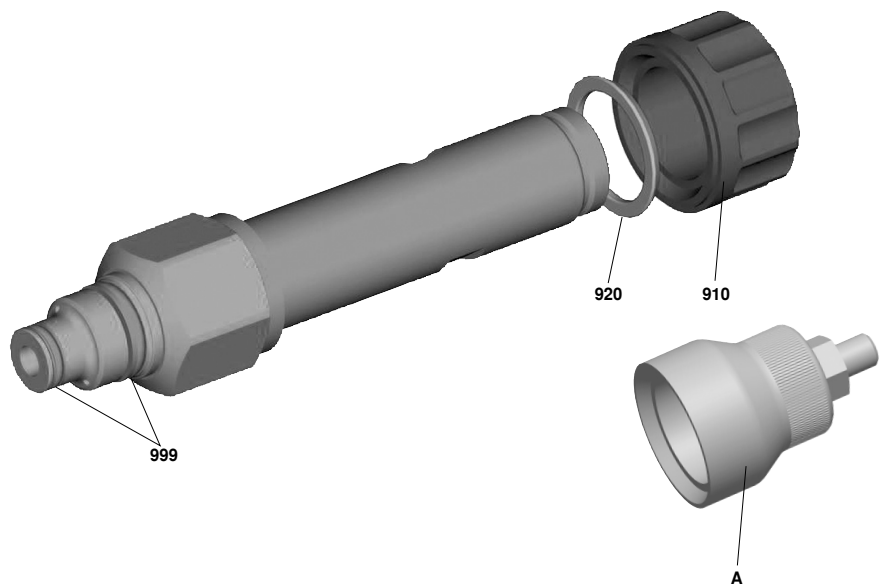
Limits of performance (measured with HLP46, $\vartheta_{oil} = 40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 24 V coil)



Attention!
 The limits of performance were determined when the solenoids were at operating temperature and at 10 % undervoltage.

Unit dimensions (dimensions in mm)

Available individual components



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003237
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

Notes

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2/2 directional poppet valve, direct operated with solenoid actuation

RE 18136-23/06.12 1/8
Replaces: 07.10

Type KSDE (High Performance)

Component size 0
Component series A
Maximum operating pressure 350 bar
Maximum flow 20 l/min



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Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5
Performance limits	5
Unit dimensions	6
Mounting cavity	7
Available individual components	8

Features

- Two different mounting cavities R/B or R/C
- Direct operated directional poppet valve with solenoid actuation, tight on both sides
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil) ¹⁾

KSDE	R	0		A	/		V	*
------	---	---	--	---	---	--	---	---

Directional poppet valve, direct operated, electrically operated

Maximum operating pressure 350 bar = R

Component size = 0

2 main ports

②

①

Normally closed

= N

②

①

Normally open

= P

Further details in the plain text

V =

Seal material

FKM seals

(other seals upon request)

Attention!

Observe compatibility of seals with hydraulic fluid used!

N0 = Without manual override

N9 = With concealed manual override

N11 = With screwable manual override

Symbol N			Symbol P		
N0	N9	N11	N0	N9	N11
X	–	X	X	X ²⁾	–

B = High Performance and mounting cavity R/B (see page 7)

C = High Performance and mounting cavity R/C (see page 7)

A = Component series

Valve types (without coil) ¹⁾

Operating pressure 350 bar		
Spool symbol	Type	Material no.
N	KSDER0NA/BN0V	R901252718
	KSDER0NA/CN0V	R901252717
P	KSDER0PA/BN0V	R901252713
	KSDER0PA/CN0V	R901252712

Available coils (separate order) ¹⁾

Direct voltage DC ⁴⁾	Material no. for coil with connector ³⁾		
	"K4"	"K40"	"C4"
	03pol (2+PE) DIN EN 175301-803	02pol K40 DT 04-2PA, make: Deutsch	02pol C4/Z30 AMP Junior-Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code **"N9"**!

³⁾ Mating connectors (order separately), see data sheet 08006

⁴⁾ Other voltages upon request

Function, section, symbols

General

The 2/2 directional poppet valves are direct operated, pressure compensated cartridge valves. They basically comprise of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

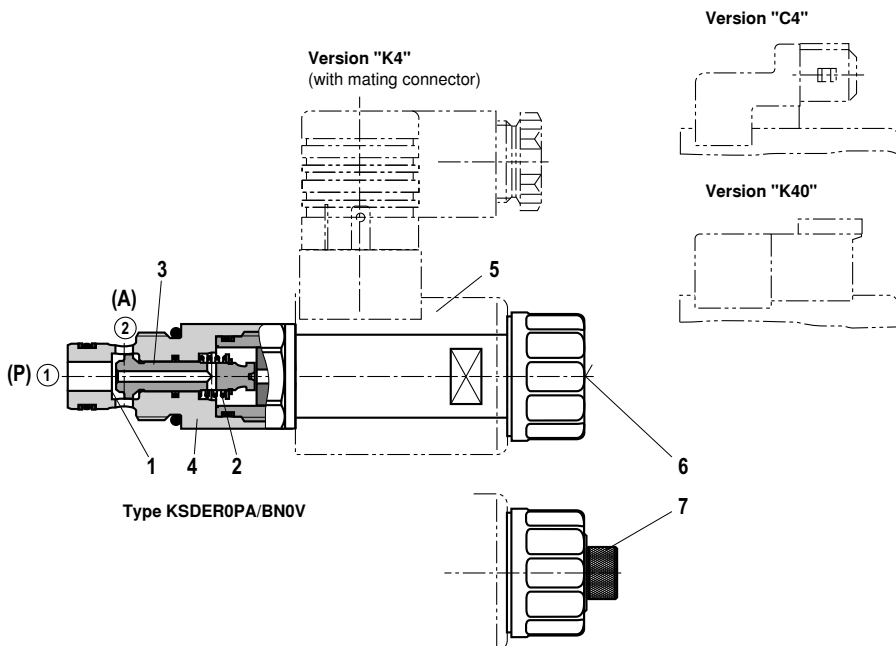
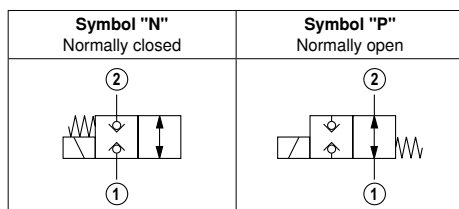
Function

The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional poppet valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar (see Technical Data, page 4).

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (5), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).

The screwable manual override (7) must be screwed back into the initial position after actuation.



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure		bar	350
Maximum flow		l/min	20 (see performance limits page 5)
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; fast biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range	– Minimum	mm ² /s	5
	– Optimum		10 to 100
	– Mmaximum		1000
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles			10 million

electrical

Voltage type			Direct voltage
Supply voltage ²⁾		V	12 DC; 24 DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON (① → ②)	ms	≤ 95
	– OFF (② → ①)	ms	≤ 95
Maximum switching frequency		1/h	9000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"		IP 65 with mating connector mounted and locked
	– Version "C4"		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version "K40"		IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

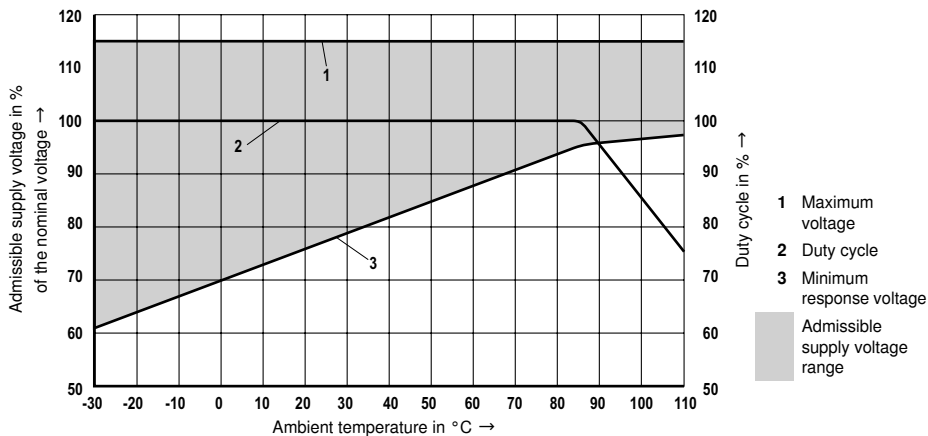
For the selection of the filters see
www.boschrexroth.com/filter.

²⁾ Other voltages upon request

³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

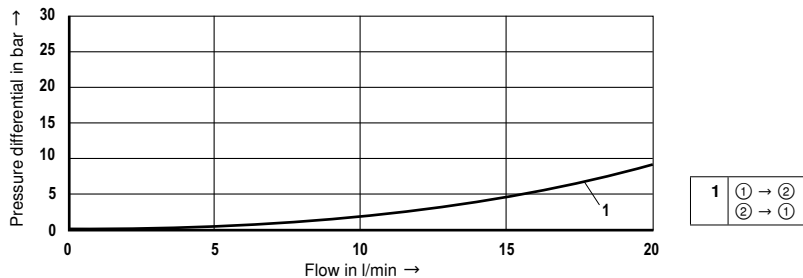
At the electrical connection "K4", the protective earthing conductor (PE ⚡) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

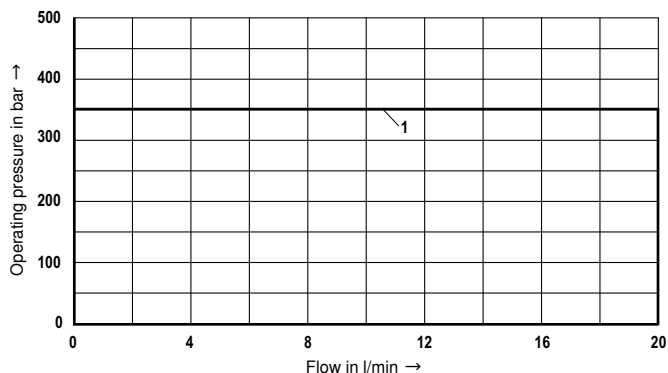


Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

Δp - q_v characteristic curves

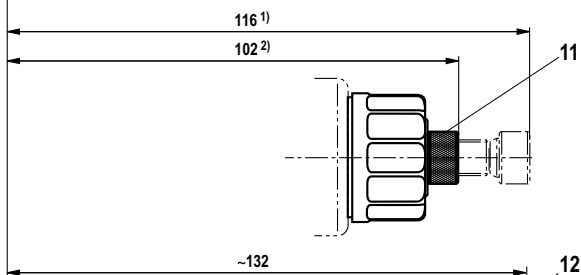
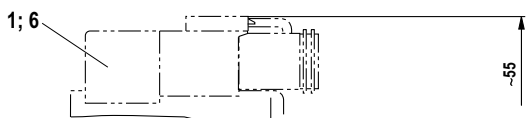
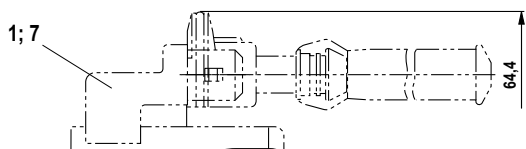
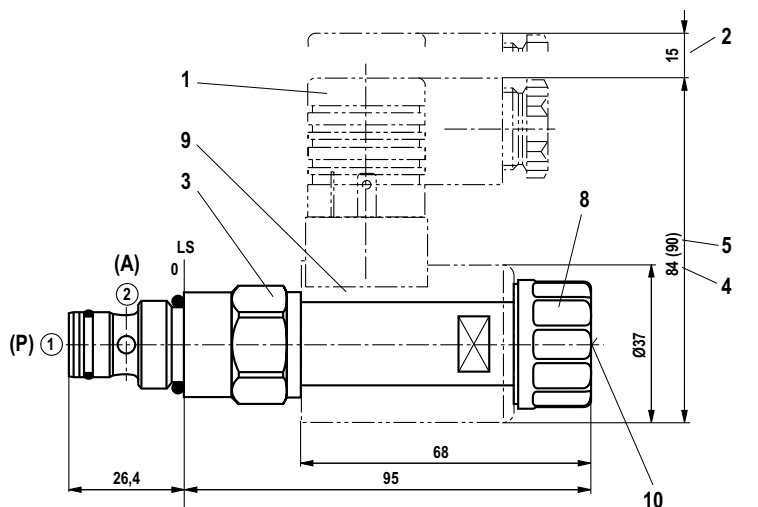


Performance limits (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)



Attention!

The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage.

Unit dimensions (dimensions in mm)

① = Main port 1, pump P³⁾

② = Main port 2, actuator A³⁾

LS = Location shoulder

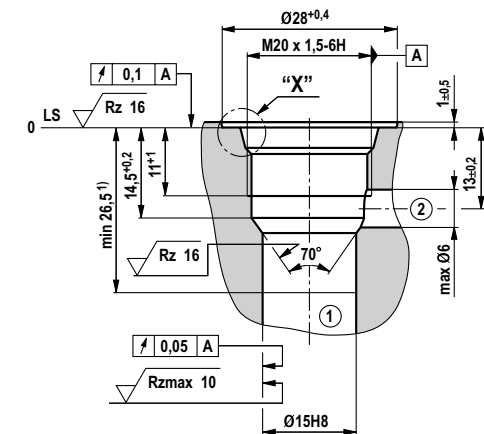
1) Actuated

2) Screwed in

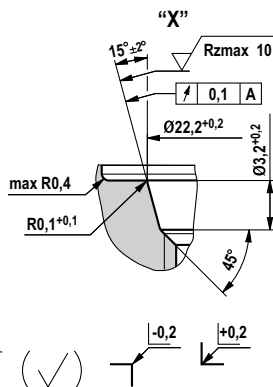
3) **Attention!**

Unambiguous pinout. P and A must not be exchanged or closed!

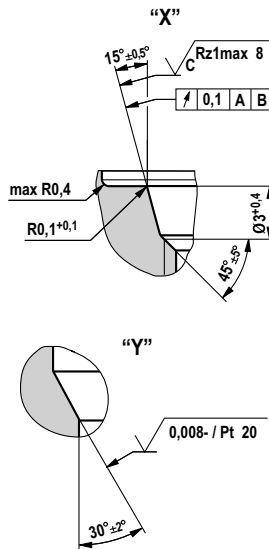
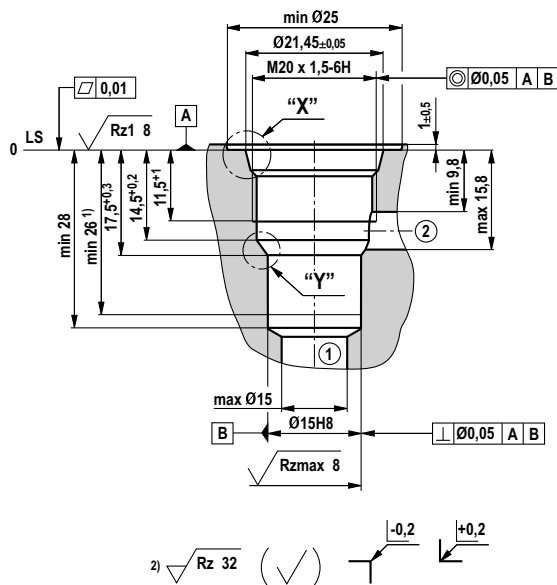
Mounting cavity, 2 main ports; thread M20 x 1.5 (dimensions in mm)



Version "B"



Version "C"



1) Depth of fit

2) Visual inspection

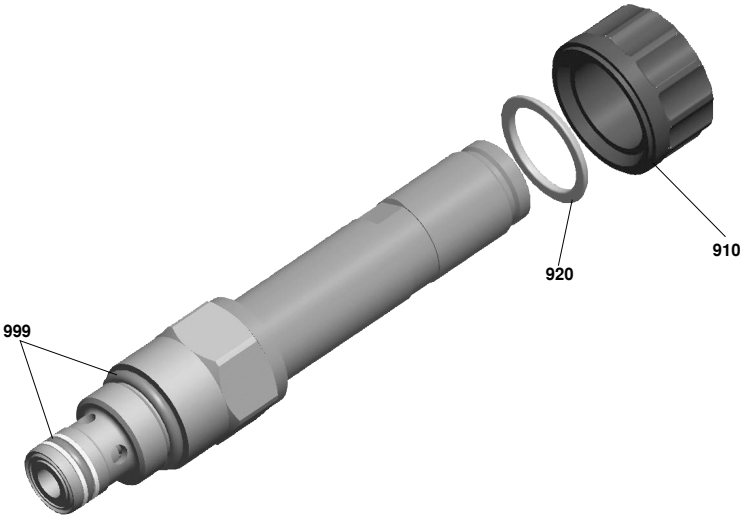
① = Main port 1

② = Main port 2

LS = Location Shoulder

All seal ring insertion faces are rounded and free of burrs
Tolerance for all angles $\pm 0.5^\circ$

Available individual components



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve (version "B")	R961005311
	Seal kit of the valve (version "C")	R961005312

Coils, separate order, see page 2

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2/2 directional seat valve, direct operated with solenoid actuation

RE 18136-20/06.12 1/8
Replaces: 08.09

Type KSDE (high-performance)

Component size 1
Component series B
Maximum operating pressure 500 bar
Maximum flow 20 l/min



H6804

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Mounting cavity	
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2	– Blocked connection tight in a leak-free form
2	– Safe switching also with longer standstill periods
3	– Wet-pin DC solenoids
4	– Rotatable solenoid coil

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil)¹⁾

KSDE		1		B / H		V		*
------	--	---	--	-------	--	---	--	---

Directional seat valve, direct operated, electrically operated

Maximum operating pressure 500 bar = U

Maximum operating pressure 350 bar = R

Component size = 1

2 main ports

	"R" (350 bar)	"U" (500 bar) "R... -17" (350 bar)	
Symbols			= N
			= P

Further details in the plain text

no code = Standard

-17 = Flow-optimized³⁾

Seal material

FKM seals

(other seals upon request)

Attention!

Observe compatibility of seals with hydraulic fluid used!

V =

N0 = without manual override

N9 = with concealed manual override

N11 = with screwable manual override

Version	Symbol N			Symbol P		
	N0	N9	N11	N0	N9	N11
R (350 bar)	X	-	X	X	X ²⁾	-
U (500 bar)	X	-	-	X	-	-

H = High-performance and mounting cavity R/T-13A (see page 7)

B = Component series

Valve types (without coil)¹⁾

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
N	KSDE1NB/HN0V	R901083194	N	KSDEU1NB/HN0V	R901083202
	KSDE1NB/HN0V-17	R901176259	P	KSDEU1PB/HN0V	R901083203
	KSDE1NB/HN11V	R901151293			
	KSDE1NB/HN11V-17	R901206914			
P	KSDE1PB/HN0V	R901083196			
	KSDE1PB/HN0V-17	R901176247			
	KSDE1PB/HN9V	R901151294			
	KSDE1PB/HN9V-17	R901206911			

Available coils (separate order)¹⁾

Direct voltage DC ⁵⁾	Material no. for coil with connector ⁴⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make: Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, material no. **R901051231**; ordering code "**N9**"!

³⁾ Only version "R" (free-flowing on one side!)

⁴⁾ Mating connectors (separate order), see RE 08006

⁵⁾ Other voltages upon request

Function, section, symbols

General

The 2/2 directional seat valves are direct operated, pressure compensated cartridge valves. They basically comprises of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

Function

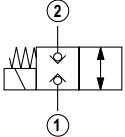
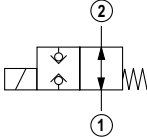
The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar/500 bar (see Technical Data, page 4).

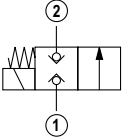
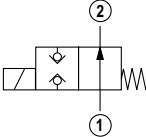
Attention!

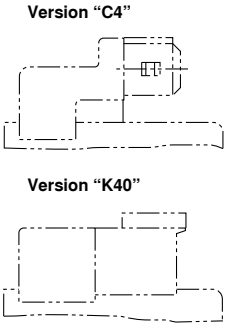
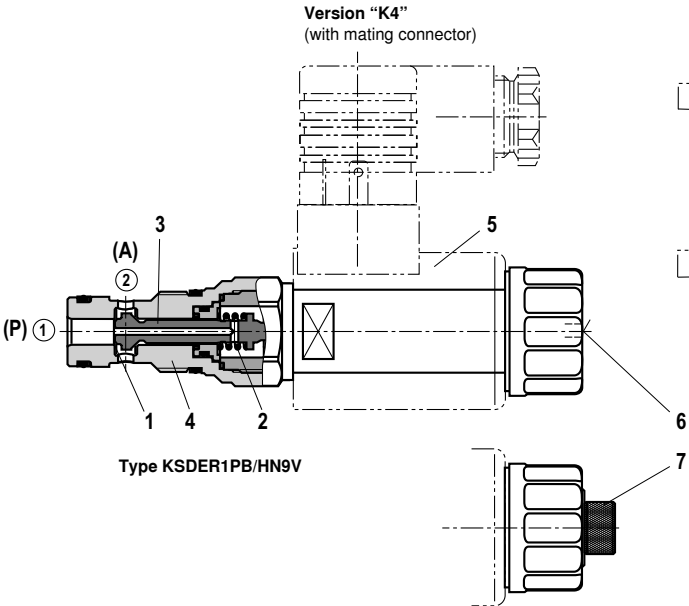
The flow is only permitted in the direction of arrow (see symbols)! With version "U" (operating pressure 500 bar) as well as with version "R...-17", main port ① must be connected with pump connection P! Valves with version "R...-17" are flow-optimized and thus achieve a higher pressure differential.

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (5), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).

Version "R" (350 bar)	
Symbol "N" normally closed	Symbol "P" normally open
	

Version "U" (500 bar) and "R...-17" (350 bar)	
Symbol "N" normally closed	Symbol "P" normally open
	



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure	– Version “U”	bar	500 (at all ports if $P \geq A$; for design reasons)
	– Version “R”	bar	350 (at all ports)
	– Version “R...-17”	bar	350 (at all ports if $P \geq A$; for design reasons)
Maximum flow	– Version “U”	l/min	12 (see performance limits page 5)
	– Version “R”	l/min	20 (see performance limits page 5)
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid – cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles	– Version “R” (350 bar)		10 million
	– Version “U” (500 bar)		5 million

electrical

Type of voltage		Direct voltage	
Supply voltage ²⁾		V	12 DC; 24 DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON (① → ②)	ms	≤ 60 (≤ 95 with version “R...-17”)
	– OFF (② → ①)	ms	≤ 60 (≤ 95 with version “R...-17”)
Maximum switching frequency	– Version “R”	1/h	9000
	– Version “U”	1/h	3600
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version “K4”		IP 65 with mating connector mounted and locked
	– Version “C4”		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version “K40”		IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

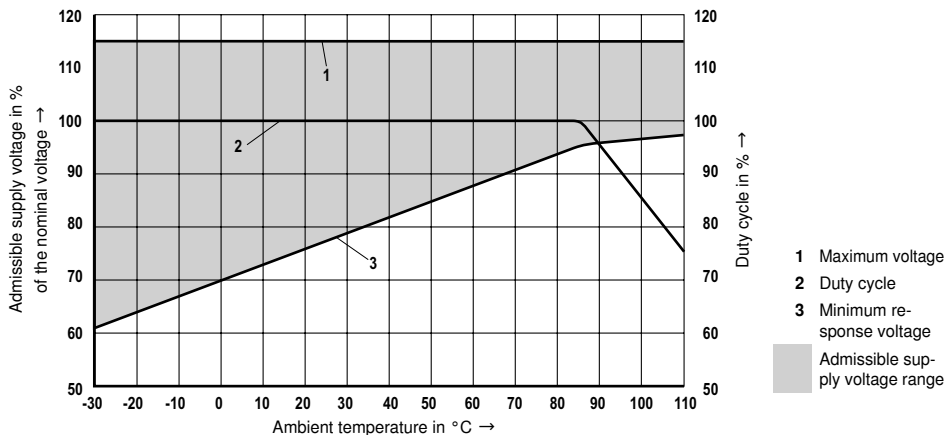
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

²⁾ Other voltages upon request

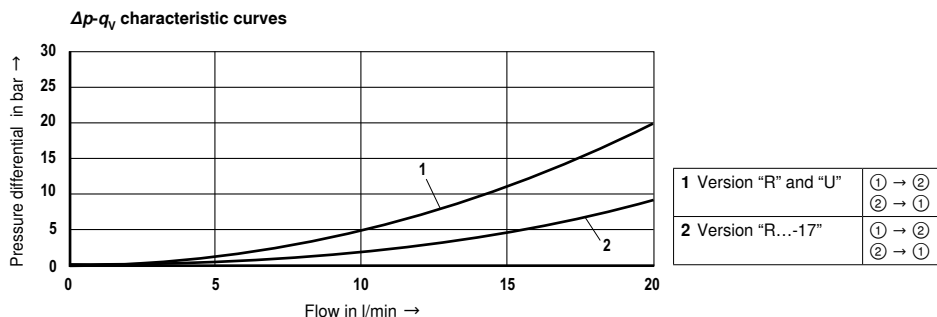
³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection “K4”, the protective earthing conductor (PE $\neq$) has to be connected properly.

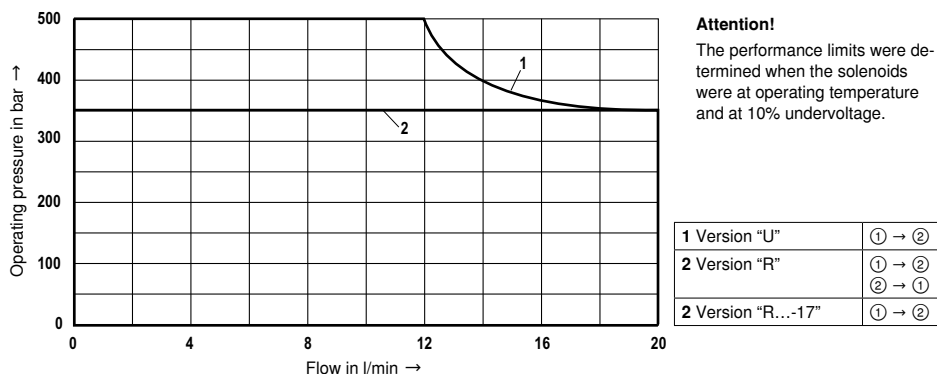
Voltage tolerance against ambient temperature; duty cycle



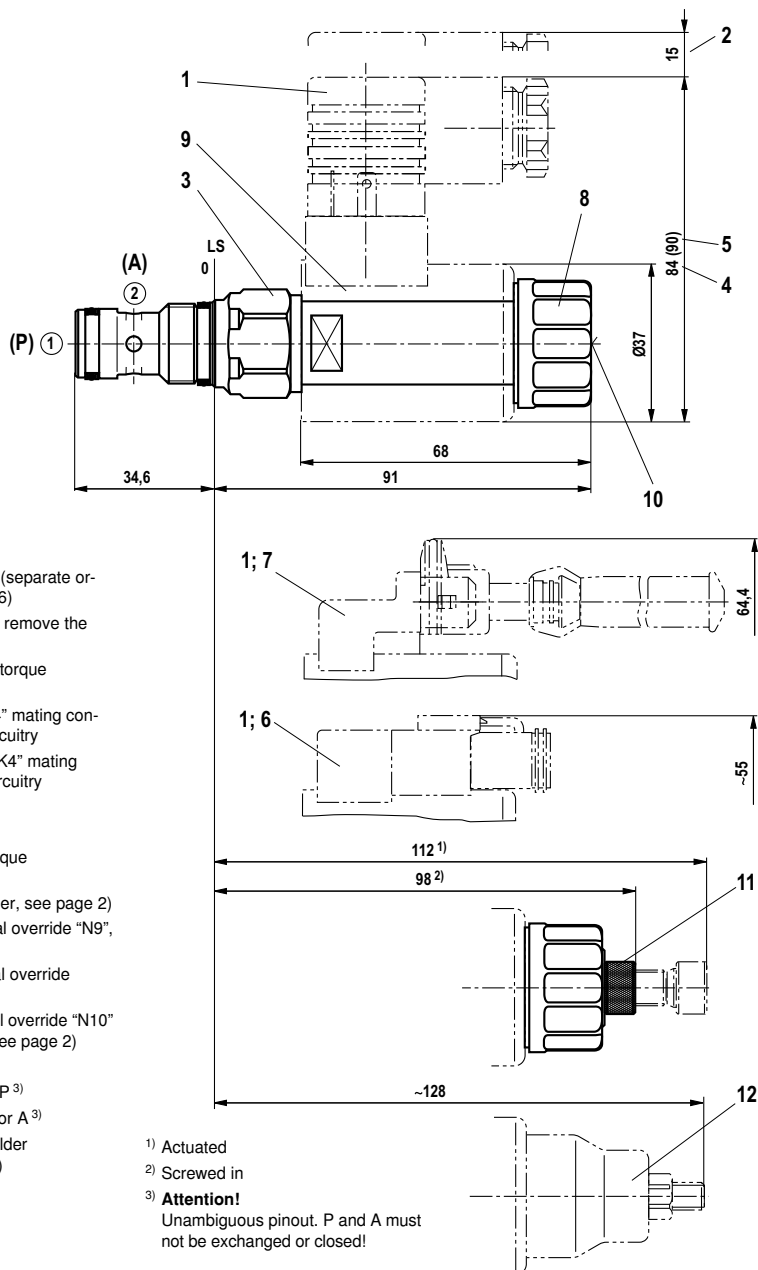
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



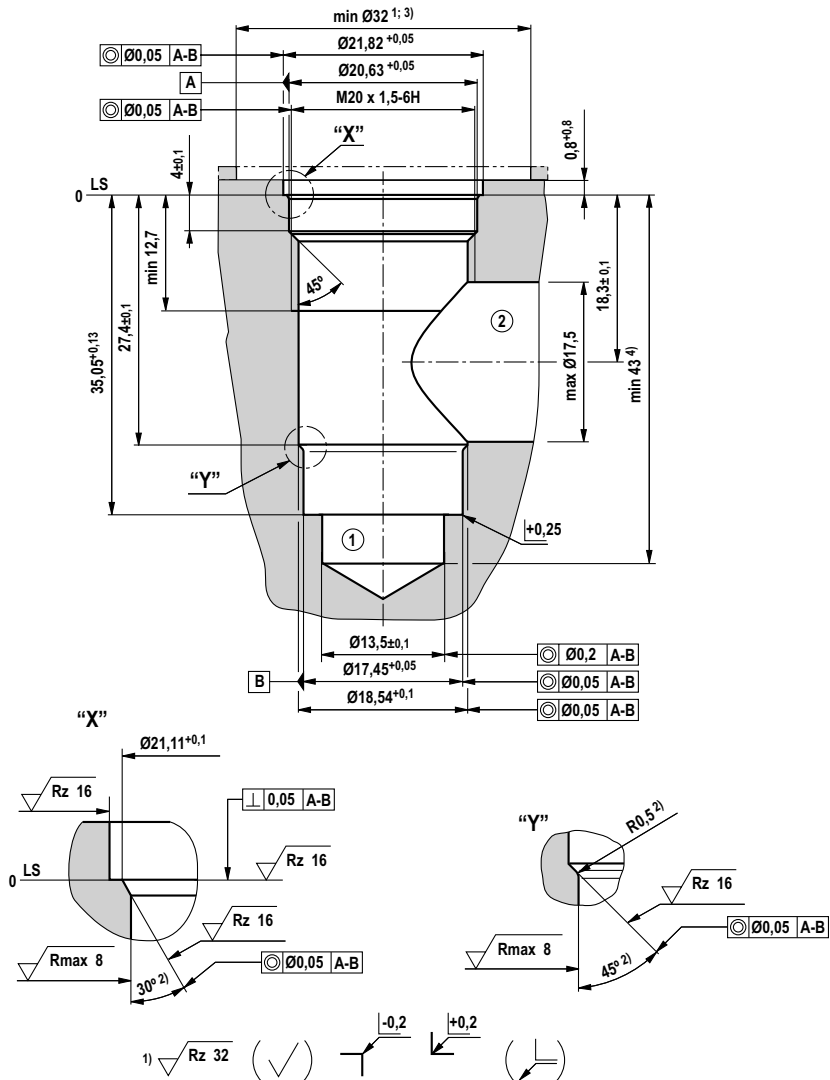
Performance limits (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



Unit dimensions (dimensions in mm)



Mounting cavity R/T-13A; 2 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-13A

²⁾ All seal ring insertion chamfers are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

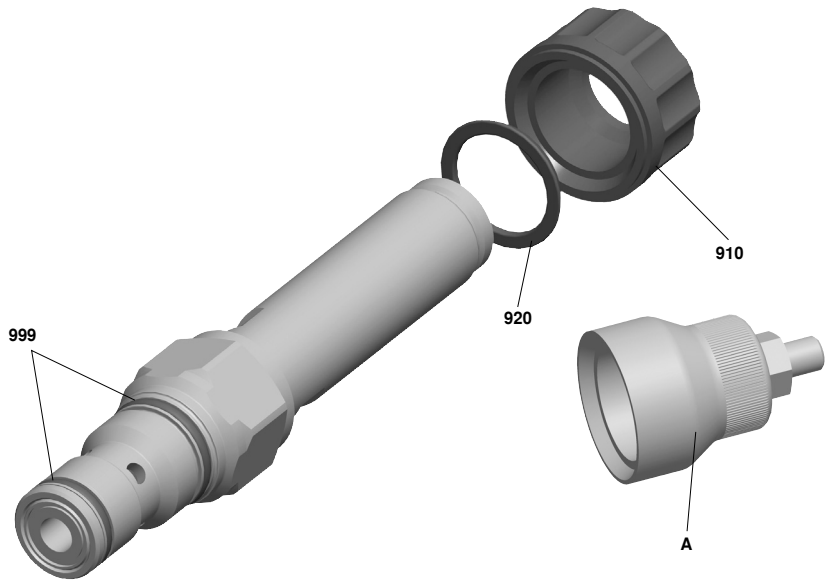
① = Main port 1

② = Main port 2

LS = Positive stop shoulder (location shoulder)

Tolerance for all angles $\pm 0.5^\circ$

Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003236
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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3/2 directional seat valve, direct operated with solenoid actuation

RE 18136-21/06.12 1/8
Replaces: 08.09

Type KSDE (high-performance)

Component size 1
Component series B
Maximum operating pressure 500 bar
Maximum flow 20 l/min



H6805

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2	– Safe switching also with longer standstill periods
3	– Wet-pin DC solenoids
4	– Rotatable solenoid coil
5	
5	
5	
6	
7	
8	

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil) ¹⁾

KSDE		1		B / H		V		*
------	--	---	--	-------	--	---	--	---

Directional seat valve, direct operated, electrically operated

Maximum operating pressure 500 bar = U

Maximum operating pressure 350 bar = R

Component size = 1

3 main ports

	"R" (350 bar)	"U" (500 bar) "R...-17" (350 bar)	
Symbols			= C
			= U

Further details in the plain text

no code = Standard

-17 = Flow-optimized ³⁾

Seal material

FKM seals

(other seals upon request)

Attention!

Observe compatibility of seals with hydraulic fluid used!

V =

N0 = without manual override

N9 = with concealed manual override

N11 = with screwable manual override
(operation by means of knurled screw)

Version	Symbol C			Symbol U		
	N0	N9	N11	N0	N9	N11
R (350 bar)	X	-	X	X	X ²⁾	-
U (500 bar)	X	-	-	X	-	-

H = High-performance and mounting cavity
R/T-11A (see page 7)

B = Component series

Valve types (without coil) ¹⁾

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
C	KSDE1CB/HN0V	R901083205	C	KSDEU1CB/HN0V	R901083198
	KSDE1CB/HN0V-17	R901176263	U	KSDEU1UB/HN0V	R901083200
	KSDE1CB/HN11V	R901151279			
	KSDE1CB/HN11V-17	R901206917			
U	KSDE1UB/HN0V	R901083191			
	KSDE1UB/HN0V-17	R901176251			
	KSDE1UB/HN9V	R901151288			
	KSDE1UB/HN9V-17	R901206909			

Available coils (separate order) ¹⁾

Direct voltage DC ⁵⁾	Material no. for coil with connector ⁴⁾		
	"K4"	"K40"	"C4"
	03pol (2+PE) DIN EN 175301-803	02pol K40 DT 04-2PA, make: Deutsch	02pol C4/Z30 AMP Junior Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, material no. R901051231; ordering code "N9"!

³⁾ Only version "R" (free-flowing on one side!)

⁴⁾ Mating connectors (separate order), see RE 08006

⁵⁾ Other voltages upon request

Function, section, symbols

General

The 3/2 directional seat valves are direct operated, pressure compensated cartridge valves. They basically comprises of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

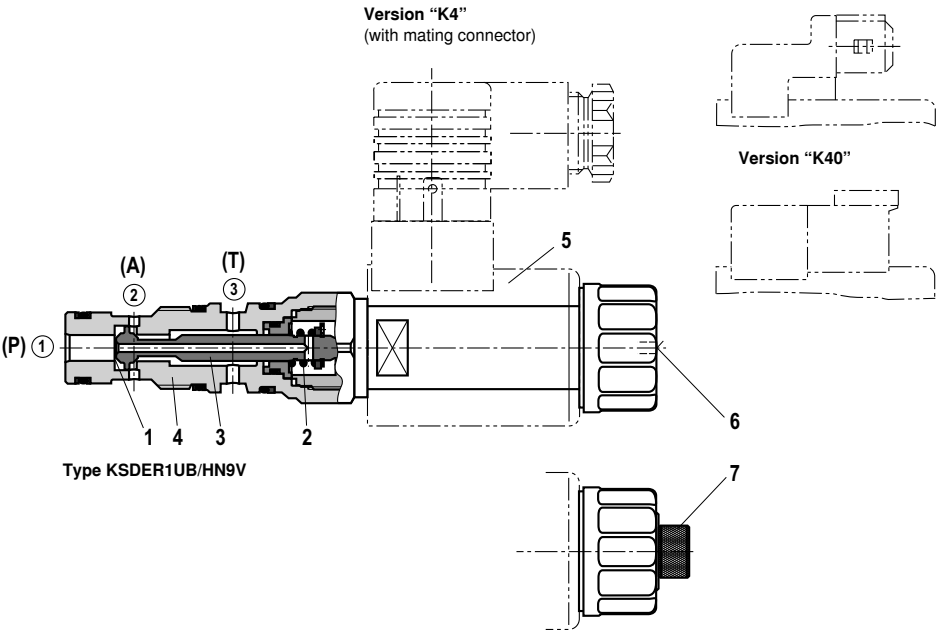
Function

The initial position of the valve (normally open "U" or normally closed "C") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 3/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar/500 bar (see Technical Data, page 4) and are blocked in a leak-free form in the respective end position. During switching, the main ports are shortly connected (negative overlap).

Attention!

The flow is only permitted in the direction of arrow (see symbols)! With version "U" (operating pressure 500 bar) as well as with version "R...-17", main port ① must be connected with pump connection P! Valves with version "R...-17" are flow-optimized and thus achieve a higher switching power. The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).

Version "R" (350 bar)		Version "U" (500 bar) and "R...-17" (350 bar)	
Symbol "C" normally closed	Symbol "U" normally open	Symbol "C" normally closed	Symbol "U" normally open



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure	– Version “U”	bar	500 (at main port ① and ②, if $P \geq A \geq T$; for design reasons)
	– Version “R”	bar	350 (at main port ① and ②)
	– Version “R...-17”		350 (at main port ① and ②, if $P \geq A \geq T$; for design reasons)
Maximum tank pressure		bar	≤ 50 (at main port ③)
Maximum flow	– Version “U”	l/min	6 (see performance limits page 5)
	– Version “R”	l/min	12 (see performance limits page 5)
	– Version “R...-17”	l/min	20 (see performance limits page 5)
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly bio-degradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles	– Version “R” (350 bar)		10 million
	– Version “U” (500 bar)		5 million

electrical

Type of voltage		Direct voltage
Supply voltage ²⁾		V 12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curve page 5
Power consumption		W 22
Duty cycle		% See characteristic curve page 5
Maximum coil temperature ³⁾		°C 150
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms ≤ 60 (≤ 95 with version “R...-17”)
	– OFF	ms ≤ 60 (≤ 95 with version “R...-17”)
Maximum switching frequency	– Version “R”	1/h 9000
	– Version “U”	1/h 3600
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version “K4”	IP 65 with mating connector mounted and locked
	– Version “C4”	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version “K40”	IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

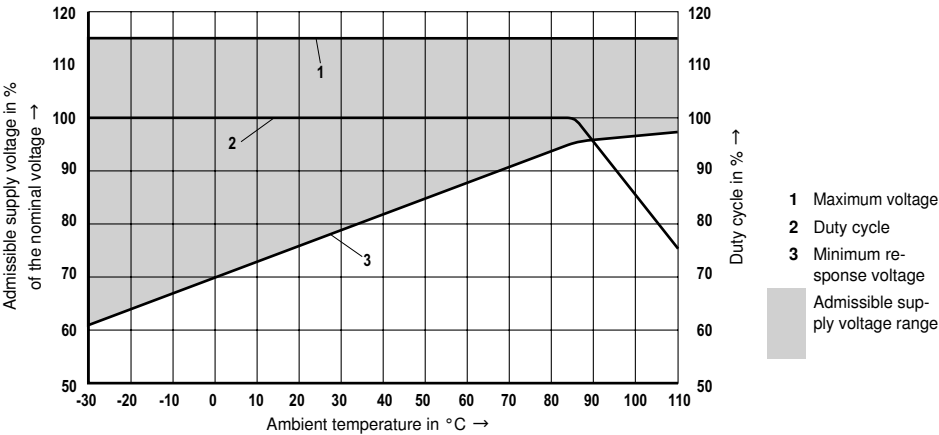
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

²⁾ Other voltages upon request

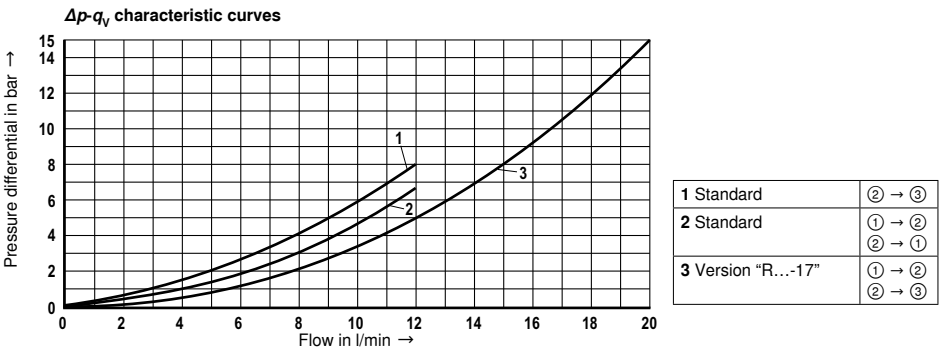
³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection “K4”, the protective earthing conductor (PE ≡) has to be connected properly.

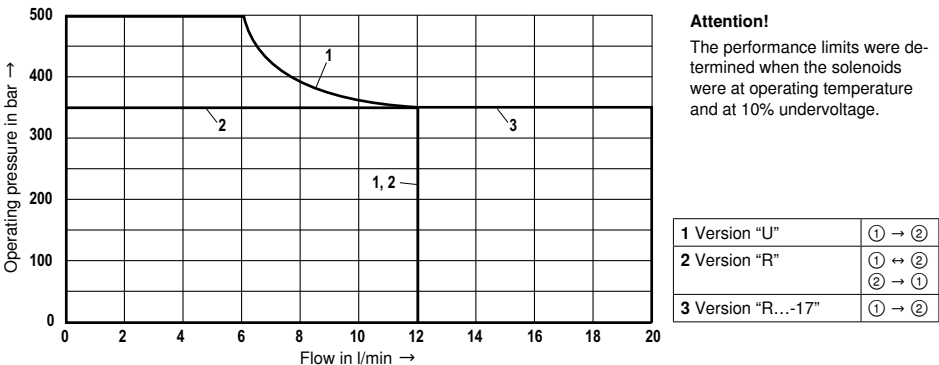
Voltage tolerance against ambient temperature; duty cycle



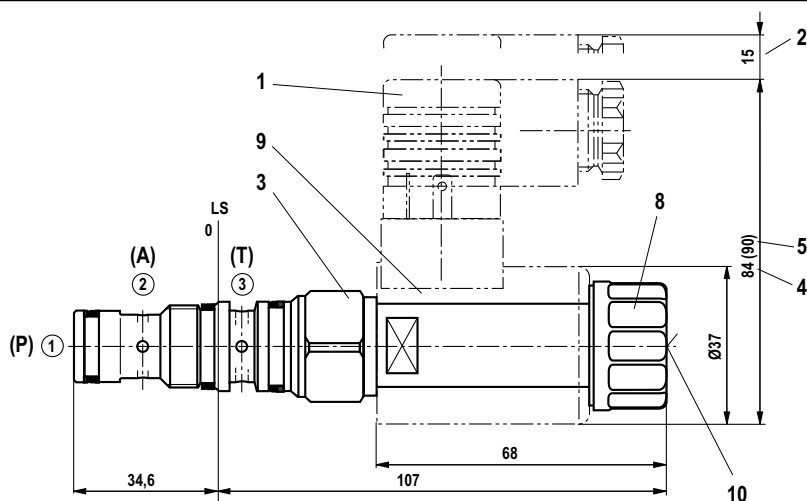
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)



Performance limits (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)



Unit dimensions (dimensions in mm)

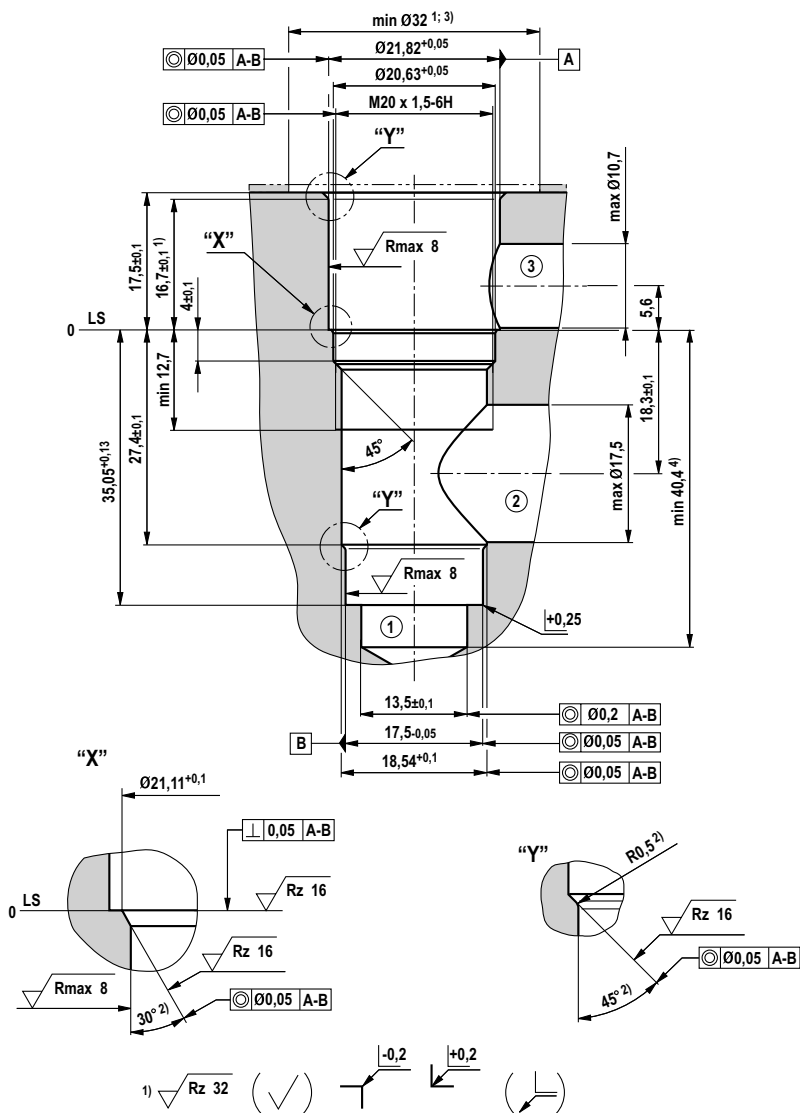


- 1 Mating connector (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque $M_A = 60^{+5}_{-5}$ Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}_{-1}$ Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N11", optional
- 12 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1, pump P ³⁾
 ② = Main port 2, actuator A ³⁾
 ③ = Main port 3, tank T ³⁾
 LS = Positive stop shoulder (location shoulder)

- ¹⁾ Actuated
- ²⁾ Acrowed in
- ³⁾ **Attention!**
Unambiguous pinout.
P, A, and T must not be exchanged or closed!

Mounting cavity R/T-11A; 3 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-11A

2) All seal ring insertion chamfers are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

① = Main port 1

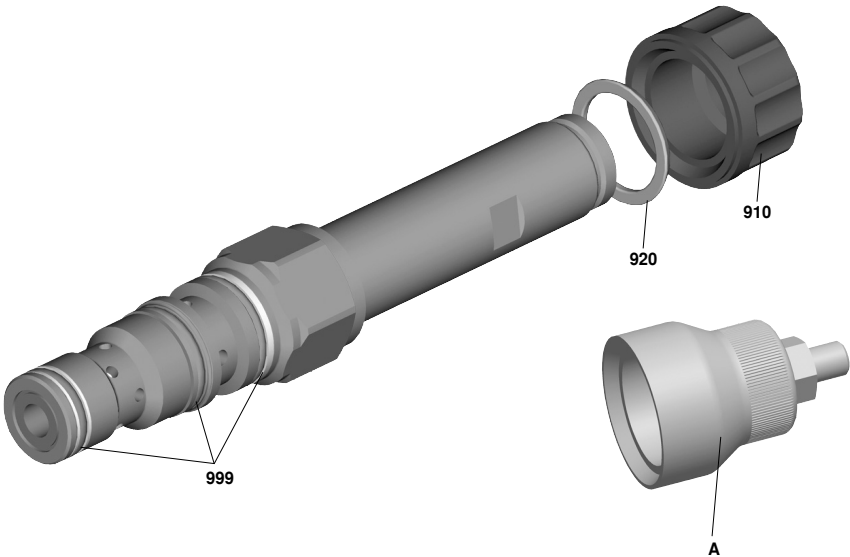
② = Main port 2

③ = Main port 3

LS = Positive stop shoulder (location shoulder)

Tolerance for all angles $\pm 0,5^\circ$

Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003235
A	Manual override "N10" 1)	R901051231

Coils, separate order, see page 2

1) Only with ordering code "N9", see page 2

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2/2 directional spool valve direct operated with solenoid actuation

RE 18136-08/06.12 1/10
Replaces: 10.09

Type KKDE (high-performance)

Component size 8
Component series A
Maximum operating pressure 350 bar
Maximum flow 45 l/min



H7010

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Voltage tolerance against ambient temperature	5
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Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

Features

- Pilot valve
- Mounting cavity R/T-8A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Positive overlap helps to avoid switching shocks
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil) ¹⁾

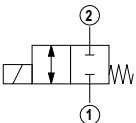
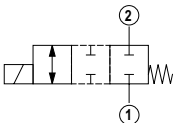
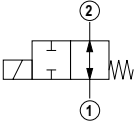
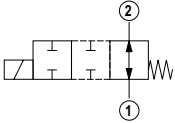
KKDE	R	8		A	/	H		V	*
------	---	---	--	---	---	---	--	---	---

Directional spool valve, direct operated, electrically operated (pilot valve)

Maximum operating pressure 350 bar = R

Component size = 8

2 main ports

Symbols		= N
		
		= P
		

Further details in the plain text

Seal material
FKM seals
(other seals upon request)
Attention!
Observe compatibility of seals
with hydraulic fluid used!

V =

N0 = **without** manual override
N9 = **with** concealed manual override ⁴⁾

H = High-performance and mounting cavity
R/T-8A (see page 9)

A = Component series

Valve types (without coil) ¹⁾

Spool variant	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
N	KKDER8NA/HN0V	R901069969	KKDER8NA/HN9V	R901069975
P	KKDER8PA/HN0V	R901069973	KKDER8PA/HN9V	R901069978

Available coils (separate order) ¹⁾

	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC ³⁾			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request
²⁾ Mating connectors (separate order), see RE 08006
³⁾ Other voltages upon request
⁴⁾ Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code "**N9**"!

Function, section, symbols

General

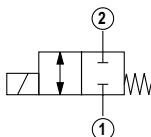
The 2/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1), the control spool (4) and a return spring (2).

Function

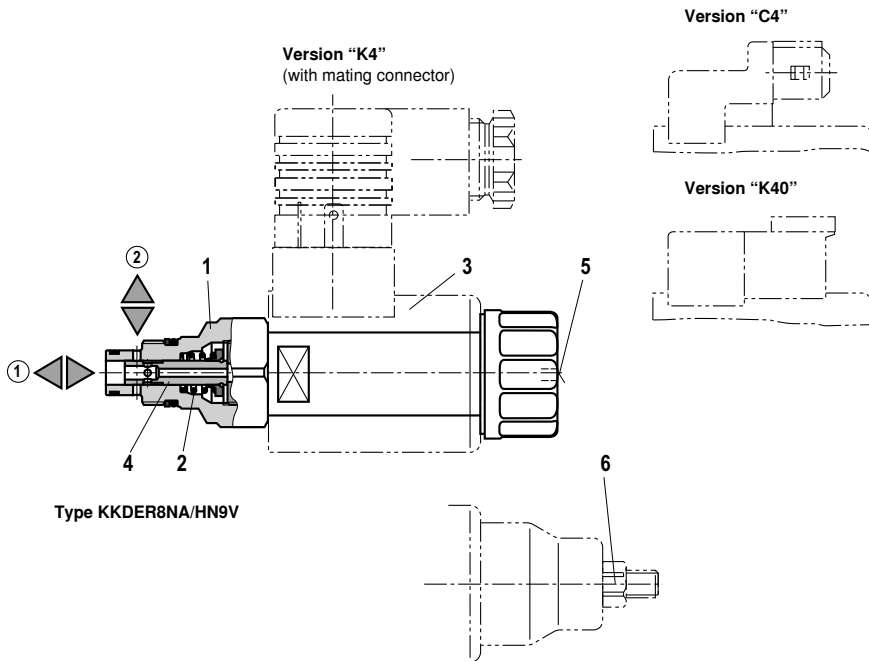
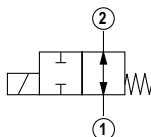
In the de-energized condition, control spool (4) is held in the initial position by the return spring (2). Control spool (4) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (N and P). The main ports ① and ② are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (5) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (6) (see page 2).

Symbol "N"



Symbol "P"



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position		Any	
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure		bar	350 (at all ports)
Maximum flow		l/min	45
Hydraulic fluid		Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request	
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾	
Load cycles		10 million (at 350 bar)	

electrical

Voltage type		Direct voltage	
Supply voltage ²⁾		V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curve page 5	
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80
	– OFF	ms	≤ 50
Maximum switching frequency		cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version “K4”	IP 65 with mating connector mounted and locked	
	– Version “C4”	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (Material no. R901022127)	
	– Version “K40”	IP 69K with mating connector mounted and locked	

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

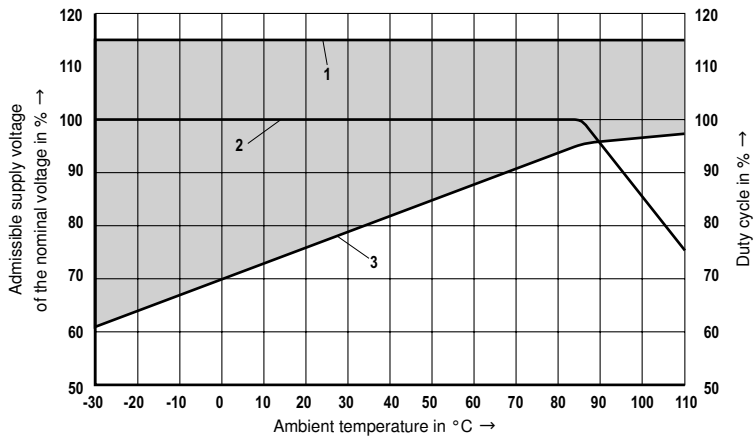
²⁾ Other voltages upon request

³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection “K4”, the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

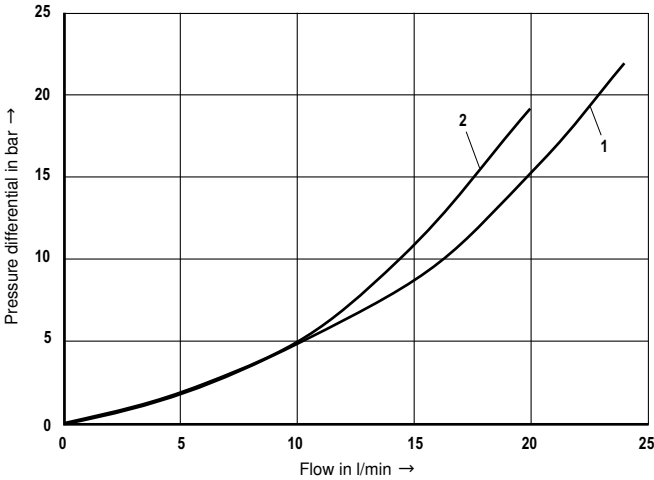
Voltage range and duty cycle depending on the ambient temperature



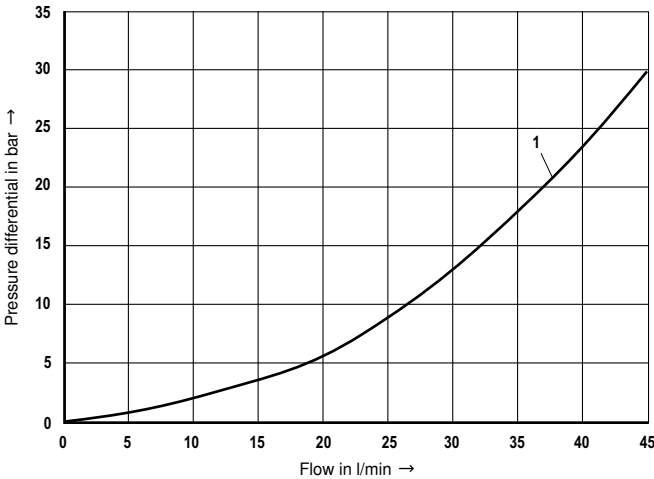
- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)

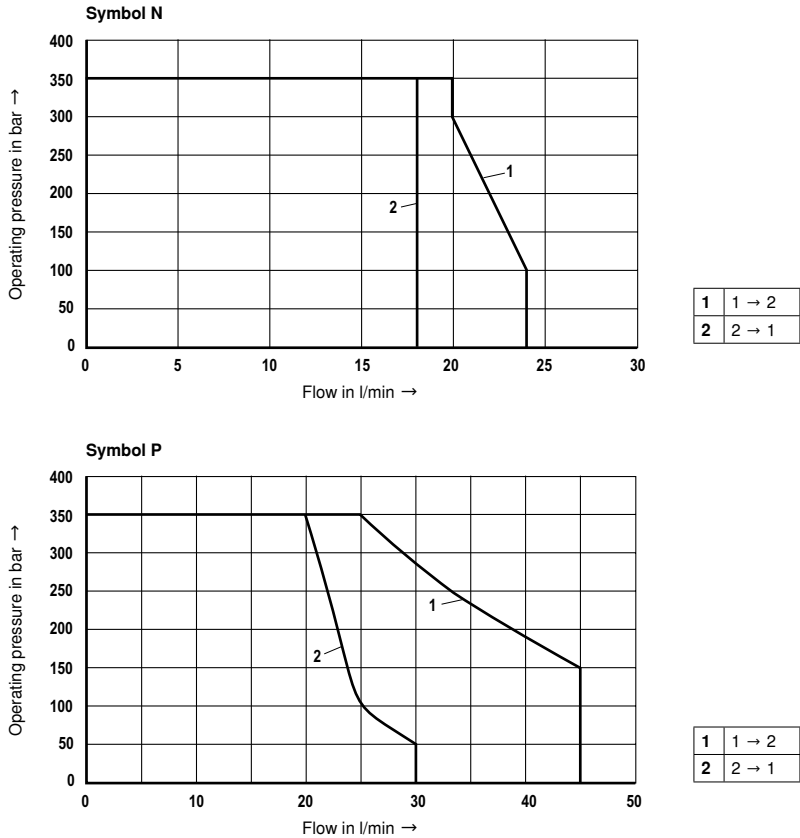
Δp - q_v characteristic curves – symbol N



Δp - q_v characteristic curves – symbol P



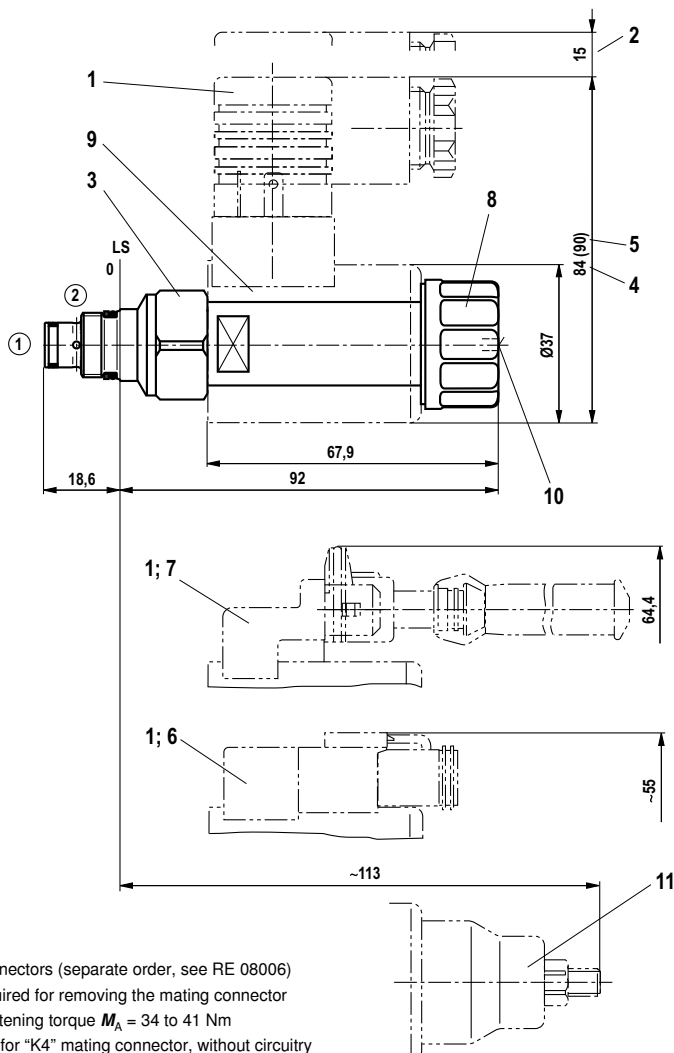
Performance limits (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)



Attention!

The performance limits were determined when the solenoids were at operating temperature and at 10% undervoltage.

Unit dimensions (dimensions in mm)



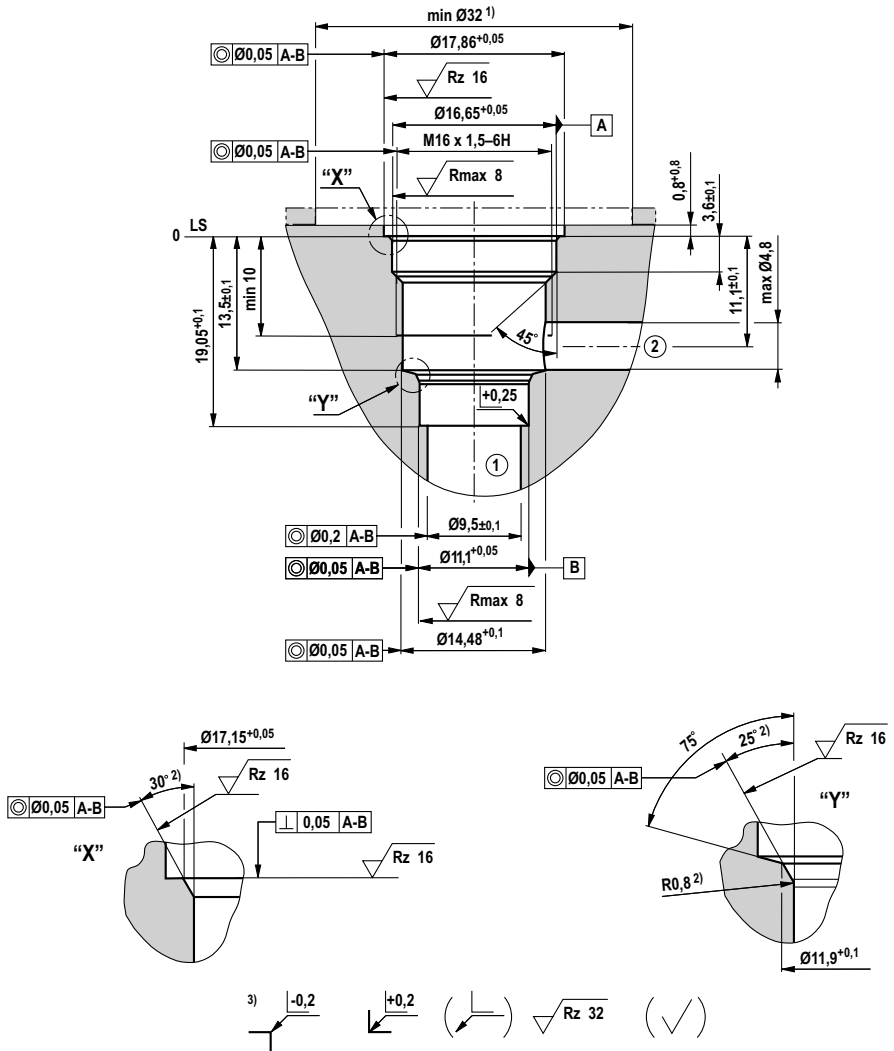
- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque $M_A = 34$ to 41 Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}$ Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1

② = Main port 2

LS = Location shoulder

Mounting cavity R/T-8A; 2 main ports; thread M16 x 1.5 (dimensions in mm)



¹⁾ with counterbore, deviating from T-8A

²⁾ All seal ring in section faces are rounded and free of burrs

3) Differing from T-8A

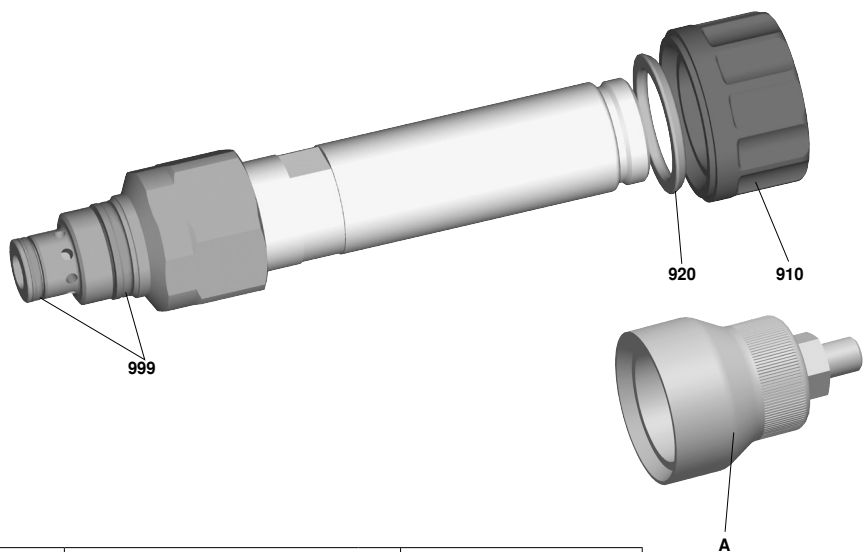
① = Main port 1

② = Main port 2

LS = Location shoulder

Tolerance for all angles $\pm 0.5^\circ$

Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003237
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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3/2 directional spool valve direct operated with solenoid actuation

RE 18136-09/06.12 1/10
Replaces: 10.09

Type KKDE (high-performance)

Component size 8
Component series A
Maximum operating pressure 350 bar
Maximum flow 30 l/min



H7011

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Characteristic curves	5, 6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

Features

- Pilot valve
- Mounting cavity R/T-9A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

Information on available spare parts:
www.boschrexroth.com/spc

Function, section, symbols

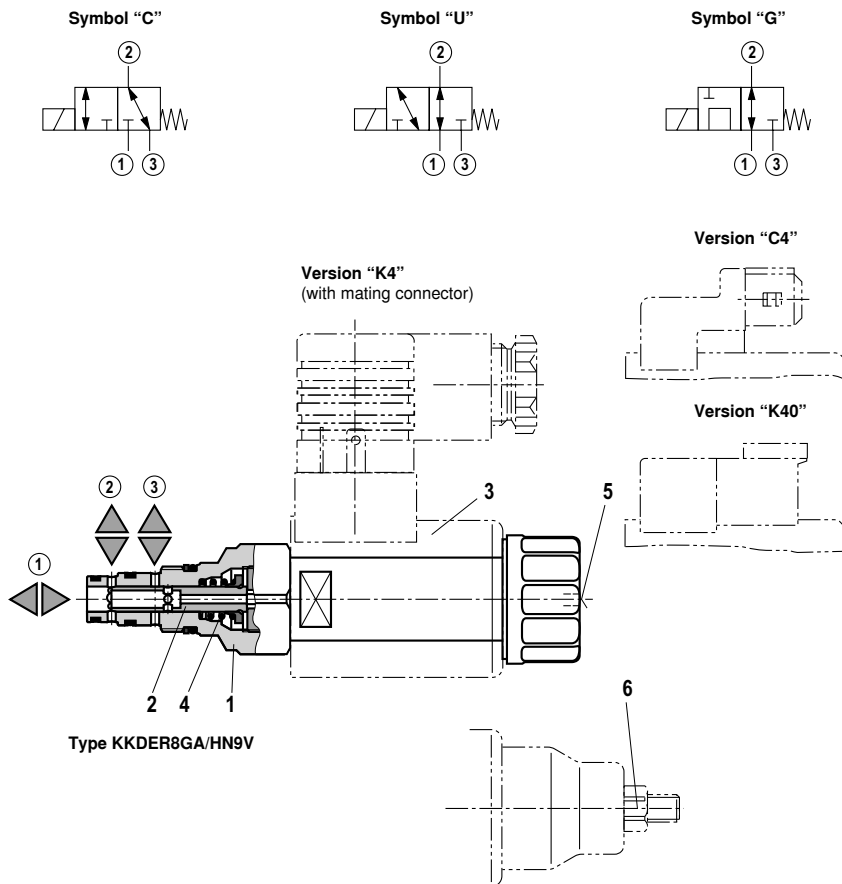
General

The 3/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1), the control spool (2) and a return spring (4).

Function

In the de-energized condition, control spool (2) is held in the initial position by the return spring (4). Control spool (2) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (C, U, and G). The main ports ①, ②, and ③ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (5) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (6) (see page 2).



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.3
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure		bar	350 (at all ports)
Maximum flow		l/min	30
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles			10 million (at 350 bar)

electrical

Voltage type			Direct voltage
Supply voltage ²⁾		V	12 DC; 24 DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80
	– OFF	ms	≤ 50
Maximum switching frequency		cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"		IP 65 with mating connector mounted and locked
	– Version "C4"		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version "K40"		IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

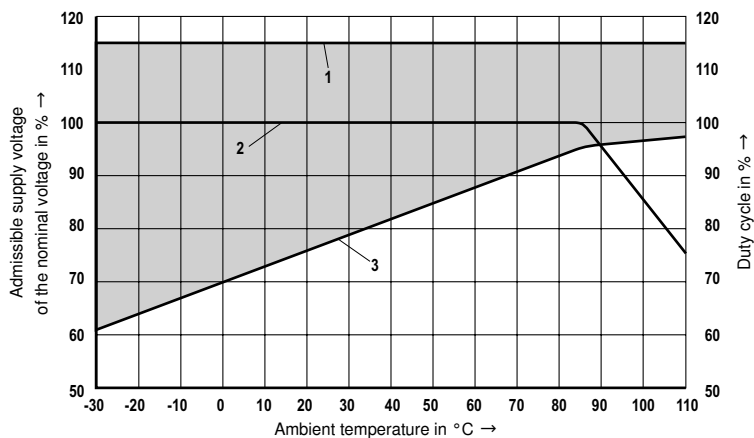
²⁾ Other voltages upon request

³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection "K4", the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

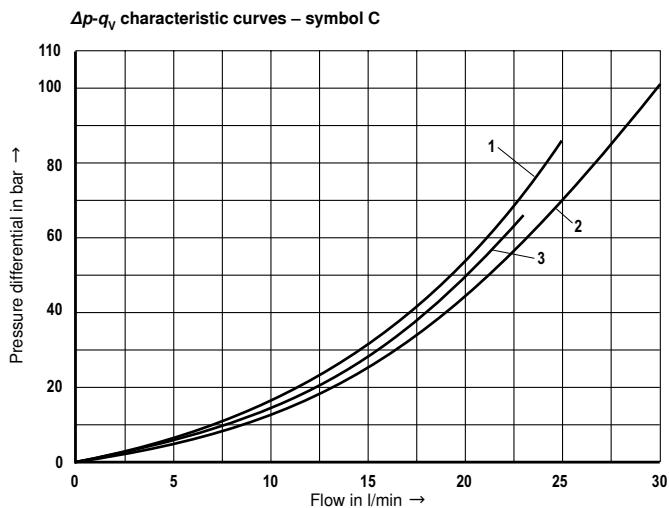
Voltage tolerance against ambient temperature; duty cycle

Voltage range and duty cycle depending on the ambient temperature



- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

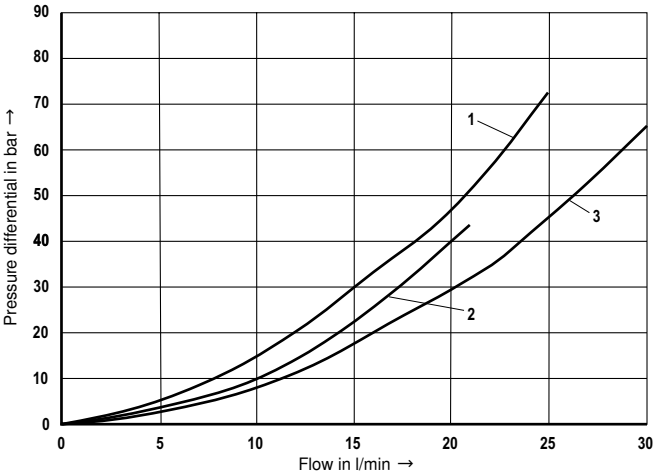
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



1	1 → 2 2 → 1
2	2 → 3
3	3 → 2

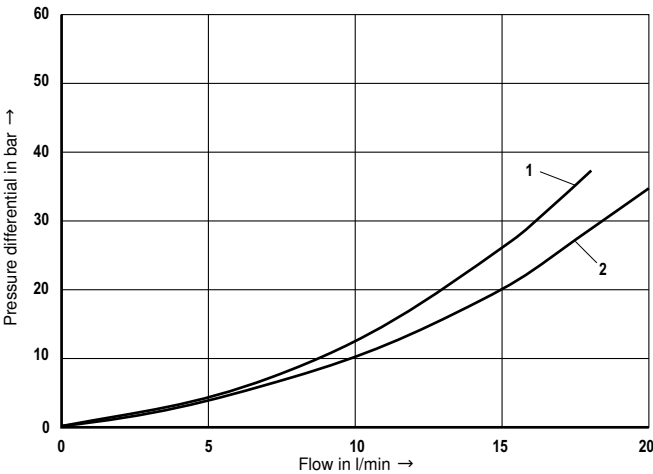
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)

Δp - q_v characteristic curves – symbol U

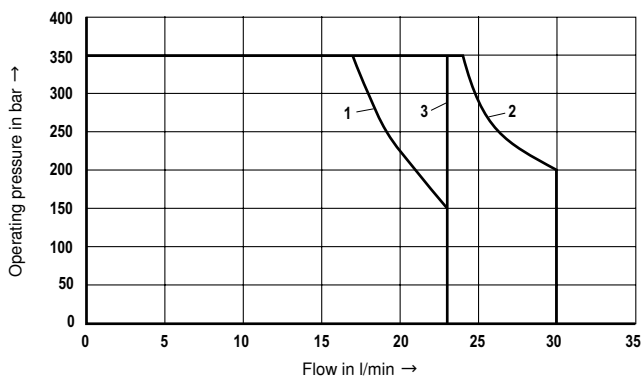
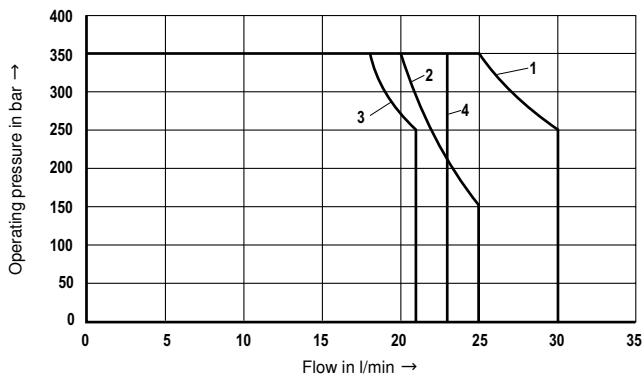
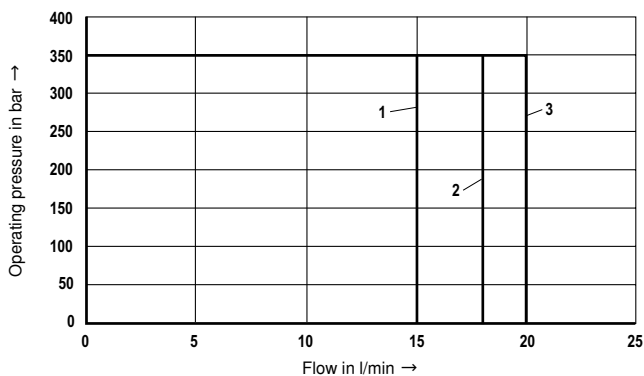


1	3 → 2
2	1 → 2
3	2 → 1 2 → 3

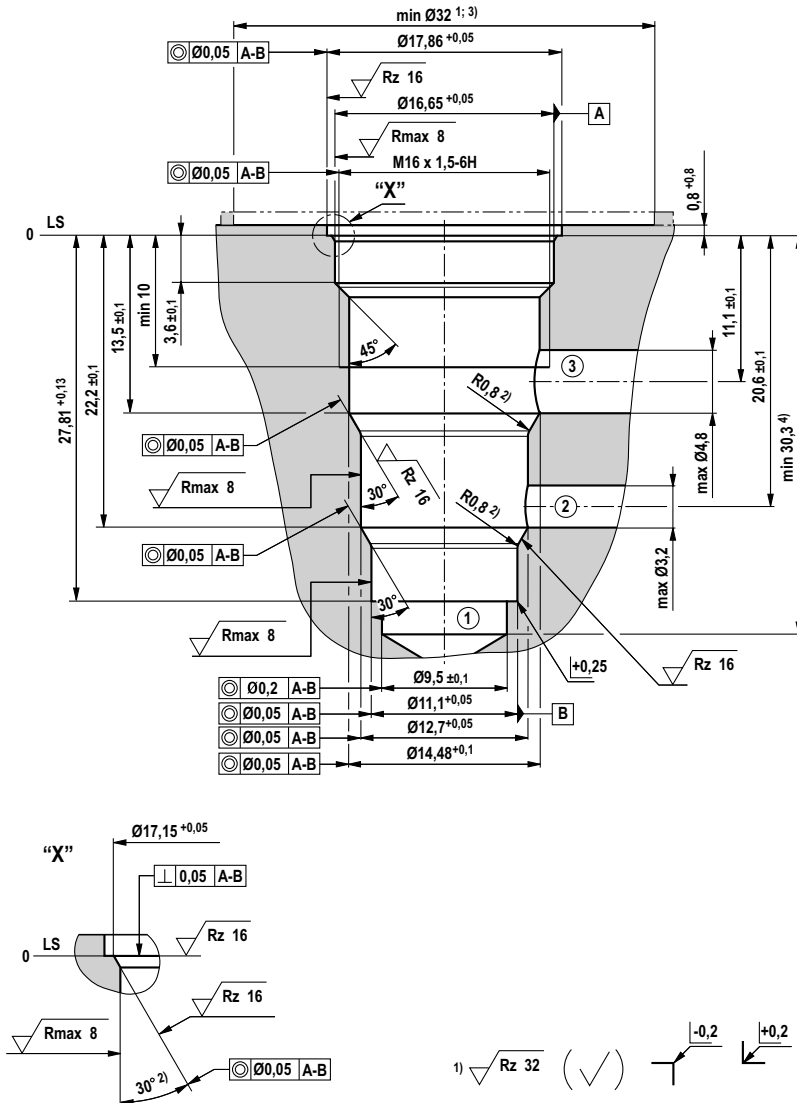
Δp - q_v characteristic curves – symbol G



1	1 → 2 3 → 1
2	1 → 3 2 → 1

Performance limits (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)
Symbol C**Symbol U****Symbol G**

Mounting cavity R/T-9A; 3 main ports; thread M1 x 1.5 (dimensions in mm)



1) Differing from T-9A

²⁾ All seal ring in section faces are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

① = Main port 1

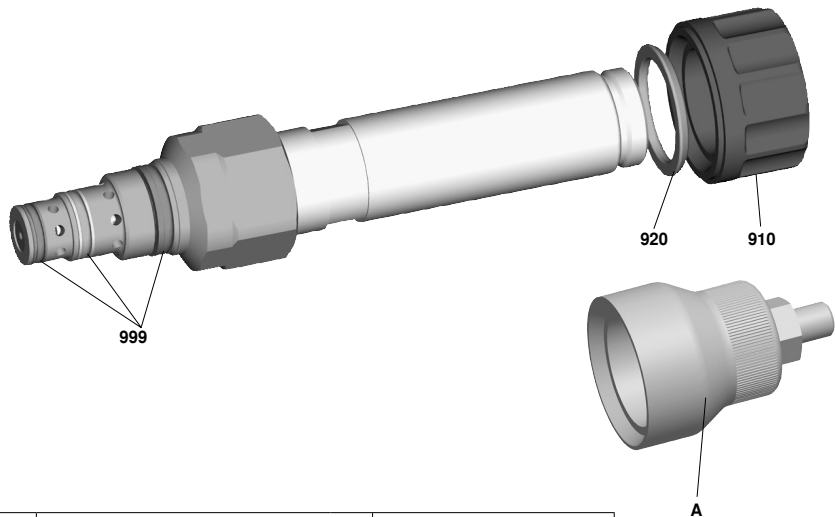
② = Main port 2

③ = Main port 3

LS = Location shoulder

Tolerance for all angles $\pm 0.5^\circ$

Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003414
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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2/2 directional spool valve direct operated with solenoid actuation

RE 18136-06/06.12 1/10
Replaces: 10.09

Type KKDE (high-performance)

Component size 1
Component series A
Maximum operating pressure 350 bar
Maximum flow 55 l/min



H6851

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Unit dimensions	8
Mounting cavity	9
Available individual components	10

Features

- Mounting cavity R/T-13A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Very low flow resistance values
- Positive overlap helps to avoid switching shocks
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil) ¹⁾

KKDE	R	1		A	/	H		V	*
------	---	---	--	---	---	---	--	---	---

Directional spool valve, direct operated, electrically operated

Maximum operating pressure 350 bar = R

Component size = 1

2 main ports

Symbols		= N

Further details in the plain text

Seal material
FKM seals
(other seals upon request)
Attention!
Observe compatibility of seals with hydraulic fluid used!

V =

N0 = **without** manual override
N9 = **with** concealed manual override ⁴⁾

H = High-performance and mounting cavity R/T-13A (see page 9)

A = Component series

Valve types (without coil) ¹⁾

Spool variant	without manual override “N0”		with concealed manual override “N9”	
	Type	Material no.	Type	Material no.
N	KKDER1NA/HN0V	R901069995	KKDER1NA/HN9V	R901069997
P	KKDER1PA/HN0V	R901069996	KKDER1PA/HN9V	R901070000

Available coils (separate order) ¹⁾

	Material no. for coil with connector ²⁾		
	“K4” 03pol (2+PE) DIN EN 175301-803	“K40” 02pol K40 DT 04-2PA, make. Deutsch	“C4” 02pol C4/Z30 AMP Junior Timer
Direct voltage DC ³⁾			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ Mating connectors (separate order), see RE 08006

³⁾ Other voltages upon request

⁴⁾ Screwable manual override “N10” possible
(Material no. **R901051231**, separate order)

Function, section, symbols

General

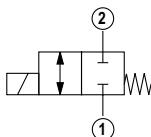
The 2/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

Function

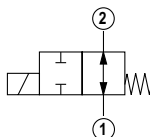
In the de-energized condition, control spool (5) is held in the initial position by the return spring (4). Control spool (5) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (N and P). The main ports ① and ② are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).

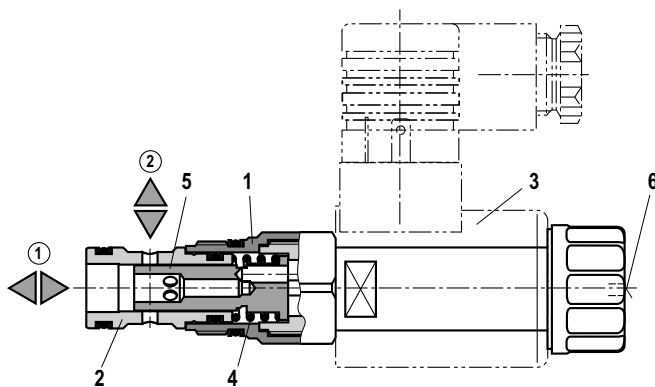
Symbol "N"



Symbol "P"

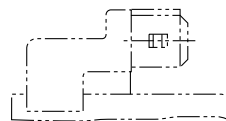


Version "K4"
(with mating connector)

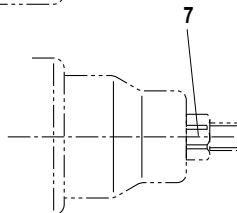
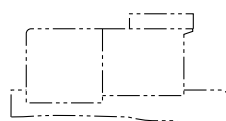


Type KKDER1NA/HN9V

Version "C4"



Version "K40"



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure		bar	350 (at all ports)
Maximum flow		l/min	55
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles			10 million (at 350 bar)

electrical

Voltage type			Direct voltage
Supply voltage ²⁾		V	12 DC; 24 DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80
	– OFF	ms	≤ 50
Maximum switching frequency		cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version “K4”		IP 65 with mating connector mounted and locked
	– Version “C4”		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version “K40”		IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

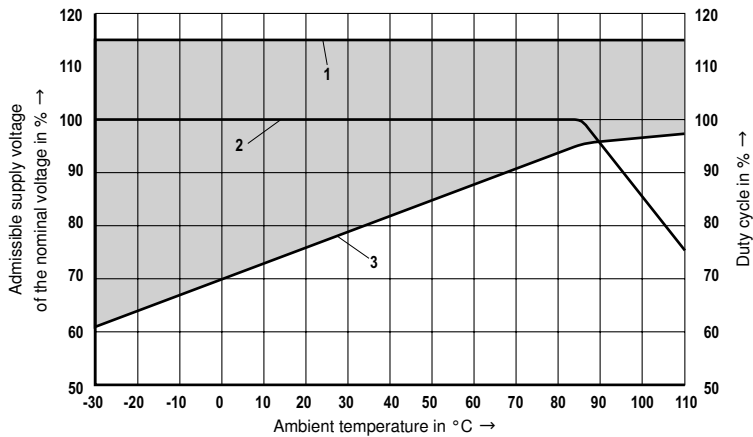
²⁾ Other voltages upon request

³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection “K4”, the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

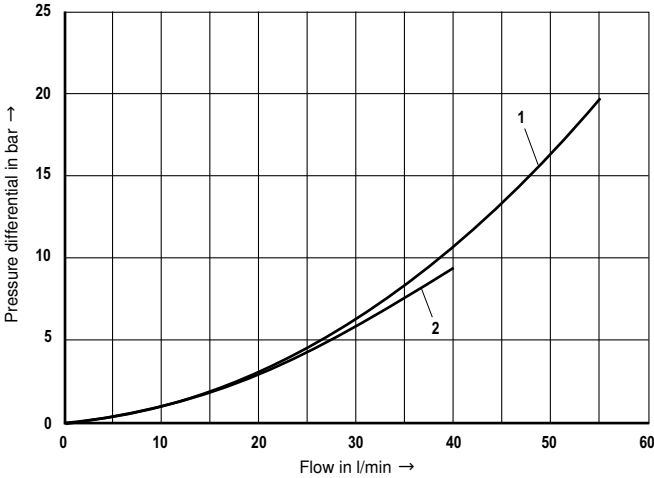
Voltage range and duty cycle depending on the ambient temperature



- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

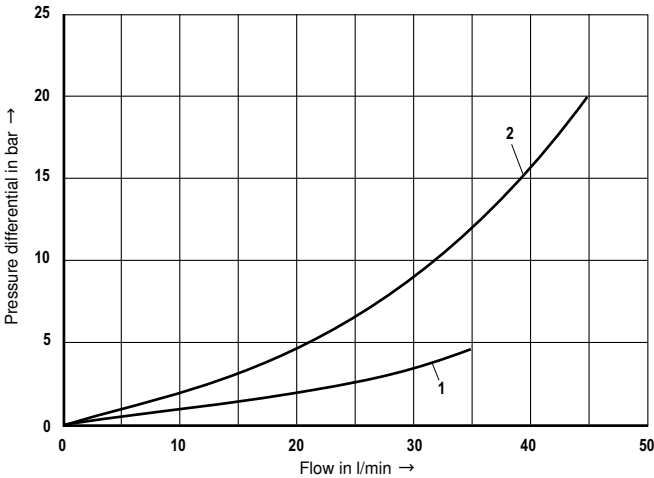
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)

$\Delta p\text{-}q_v$ characteristic curves – symbol N



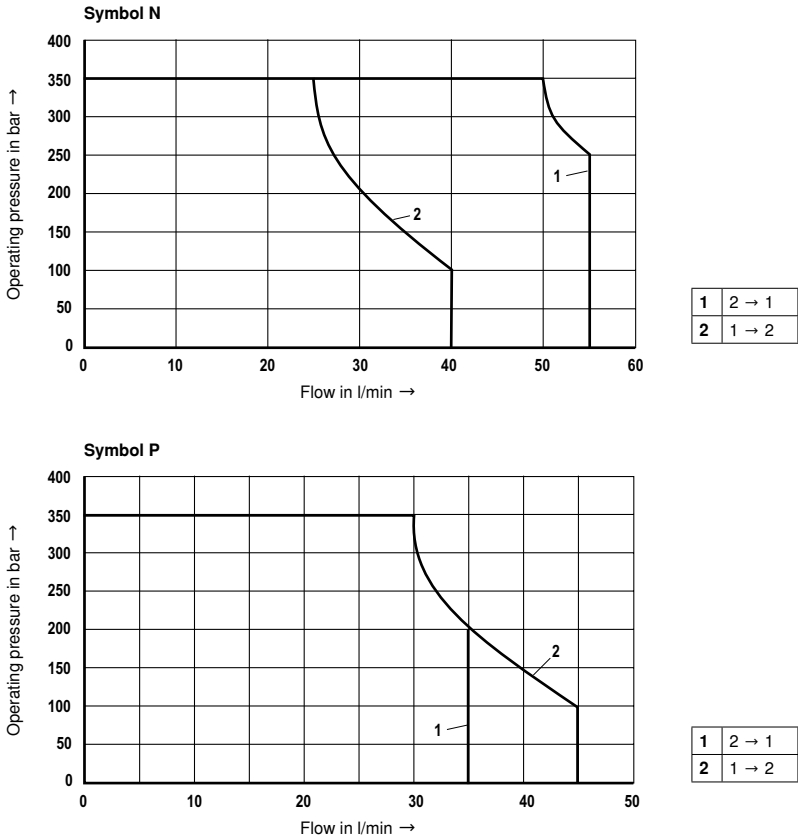
1	2 → 1
2	1 → 2

$\Delta p\text{-}q_v$ characteristic curves – symbol P



1	2 → 1
2	1 → 2

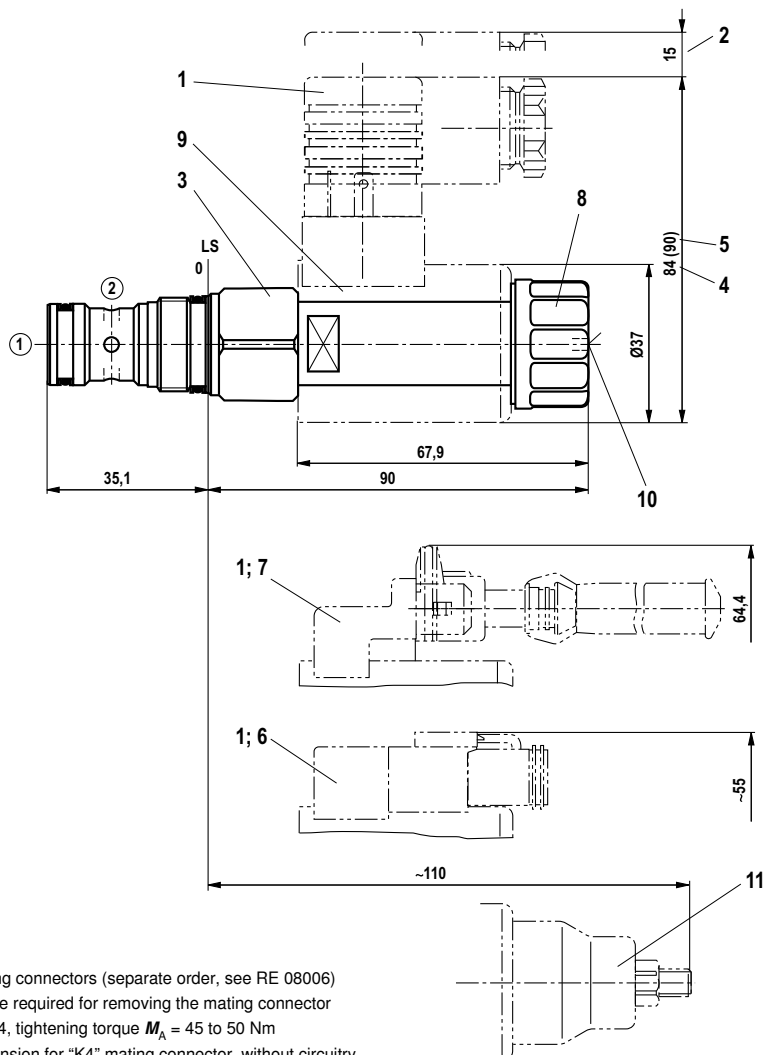
Performance limits (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)



Attention!

The performance limits were determined when the solenoids were at operating temperature and at 10% undervoltage.

Unit dimensions (dimensions in mm)

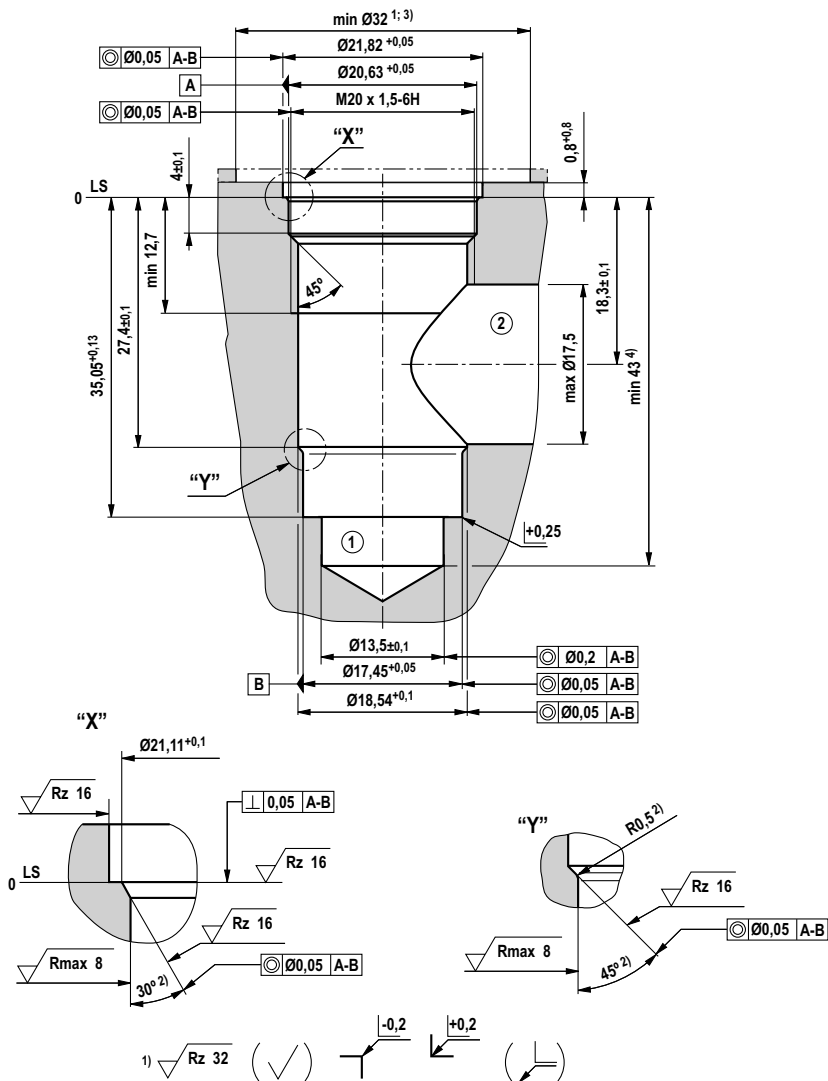


① = Main port 1

② = Main port 2

LS = Location shoulder

Mounting cavity R/T-13A; 2 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-13A

2) All seal ring in section faces are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

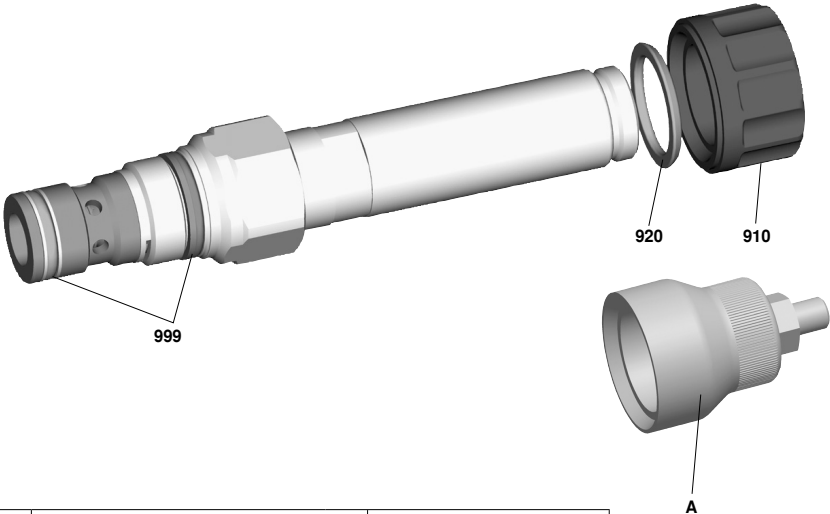
① = Main port 1

② = Main port 2

LS = Location Shoulder

Tolerance for all angles $\pm 0,5^\circ$

Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003236
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

3/2 directional spool valve, direct operated with solenoid actuation

RE 18136-04/06.11 1/10
Replaces: 10.09

Type KKDE (high-performance)

Size 1
Component series A
Maximum operating pressure 350 bar
Maximum flow 60 l/min



H6810

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Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4, 5
Voltage tolerance against ambient temperature	5
Characteristic curves	6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

Features

- Direct operated directional spool valve with solenoid actuation
- Mounting cavity R/T-11A
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- with concealed manual override

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (valve without coil) ¹⁾

KKDE	R	1		A	/	H		V	*
------	---	---	--	---	---	---	--	---	---

Directional spool valve, direct operated, electrically operated

Maximum operating pressure 350 bar = R

Size = 1

3 main ports

Symbols ²⁾

= C

= U

Further details in the plain text

Seal material
FKM seals
(Other seals upon request)
Attention!
Observe compatibility of seals with hydraulic fluid used!

V =

N0 = Without manual override

N9 = With concealed manual override ⁵⁾

H = High-performance and mounting cavity R/T-11A (see page 9)

A = Component series

Valve types (without coil) ¹⁾

Spool symbol	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
C	KKDER1CA/HN0V	R901070094	KKDER1CA/HN9V	R901070103
U	KKDER1UA/HN0V	R901070099	KKDER1UA/HN9V	R901070105

Available coils (separate order) ¹⁾

	Material no. for coil with connector ³⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC ⁴⁾			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ With transition function during the switching process

³⁾ Mating connectors, separate order, see data sheet 08006

⁴⁾ Other voltages upon request

⁵⁾ Screwable manual override "N10" possible
(Material no. **R901051231**, separate order)

Function, section, symbols

General

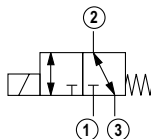
The 3/2 directional spool valves are direct operated, pressure-compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

Function

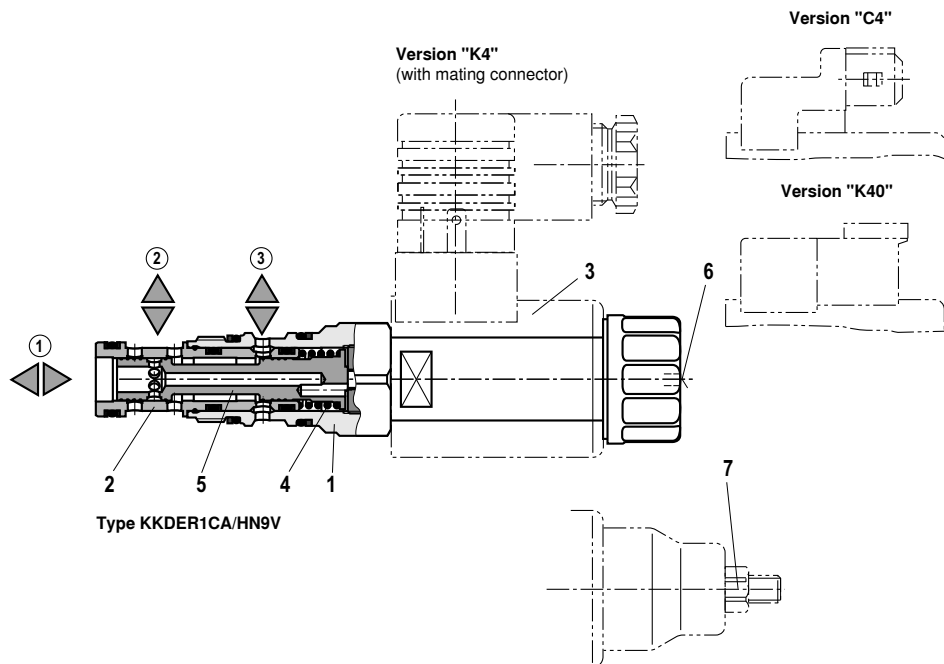
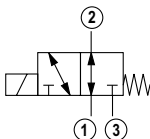
In the de-energized condition, the control spool (5) is held in the initial position by the return spring (4). The control spool (5) is actuated by wet-pin DC solenoids (3). The symbols are realized by different spools (C or U). The main ports ①, ②, and ③ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).

Symbol "C"



Symbol "U"



Technical data (For applications outside these parameters, please consult us!)

general

Weight	– Valve	kg	0.3
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	60
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	–40 to +80
Viscosity range	mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾
Load cycles		10 million (at 350 bar)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLPD	FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HEES	FKM
	HEPR	FKM	ISO 15380
Flame-resistant	– Soluble in water	HEPG	FKM
	– Water-free	HFDU, HFDR	FKM
	– Water-containing	HFAS	FKM

 **Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.

- **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion!
Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
- **Environmentally compatible:** When using environmentally compatible hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the medium (700 mg zinc per pole tube).

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.
For the selection of the filters see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)

electric

Voltage type			Direct voltage
Supply voltage ²⁾	V	12 DC; 24 DC	
Voltage tolerance against ambient temperature			See characteristic curve below
Power consumption	W	22	
Duty cycle	%	See characteristic curve below	
Maximum coil temperature ³⁾	°C	150	
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80
	– OFF	ms	≤ 50
Maximum switching frequency	cy/h	15000	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"	IP 65 with mating connector mounted and locked	
	– Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (Material no. R901022127)	
	– Version "K40"	IP 69K with mating connector mounted and locked	

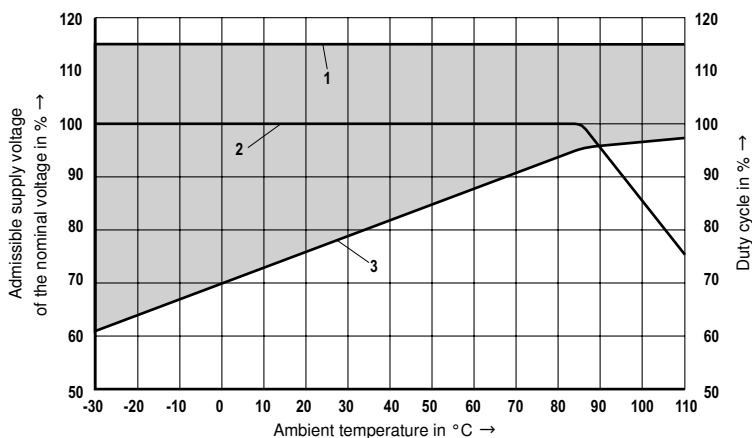
²⁾ Other voltages upon request

³⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection "K4", the protective earthing conductor (PE $\pm$) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

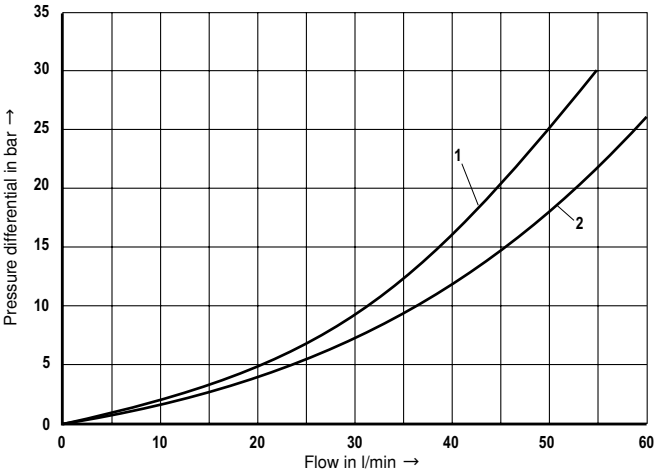
Voltage range and duty cycle depending on the ambient temperature



- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

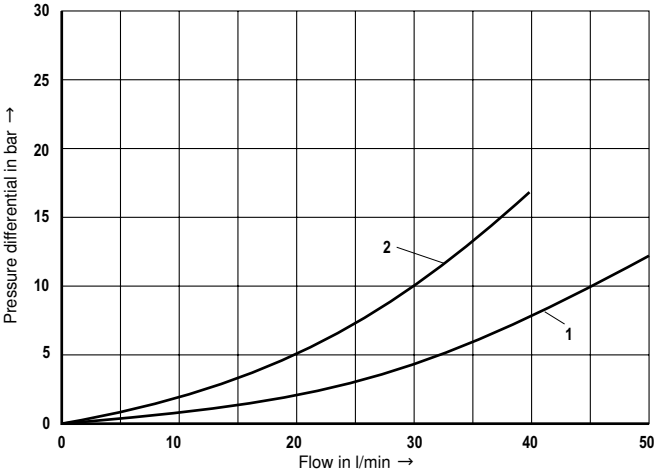
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 24 V coil)

Δp - q_v characteristic curves – symbol C



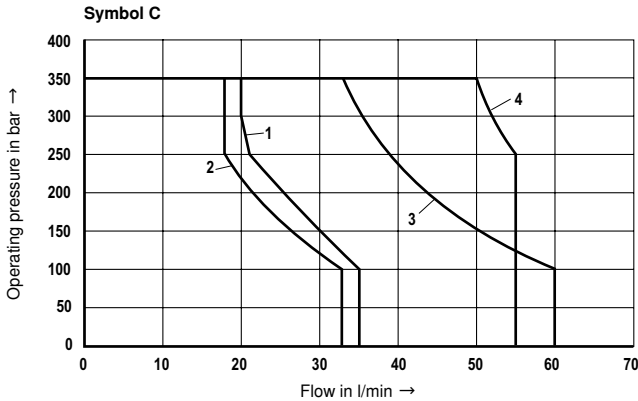
1	① → ② ② → ①
2	③ → ② ② → ③

Δp - q_v characteristic curves – symbol C



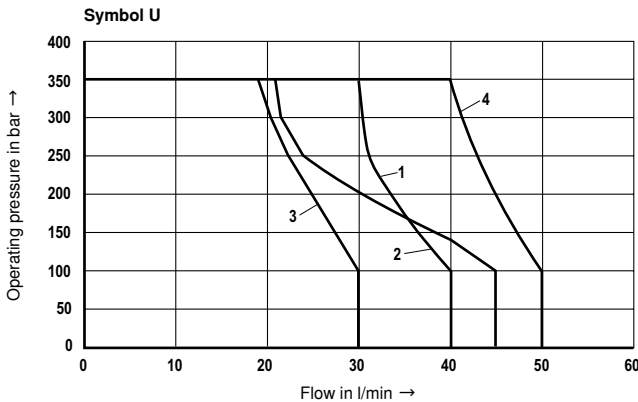
1	① → ② ② → ①
2	③ → ② ② → ③

Performance limits (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

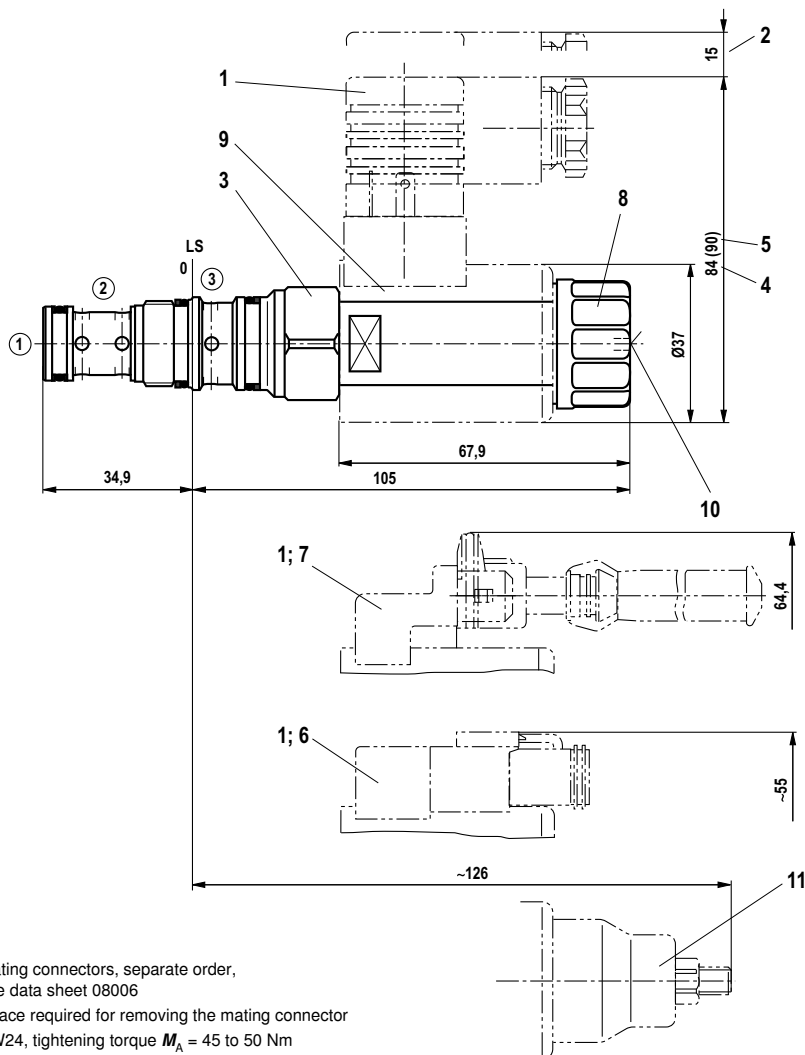


Attention!

The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage.



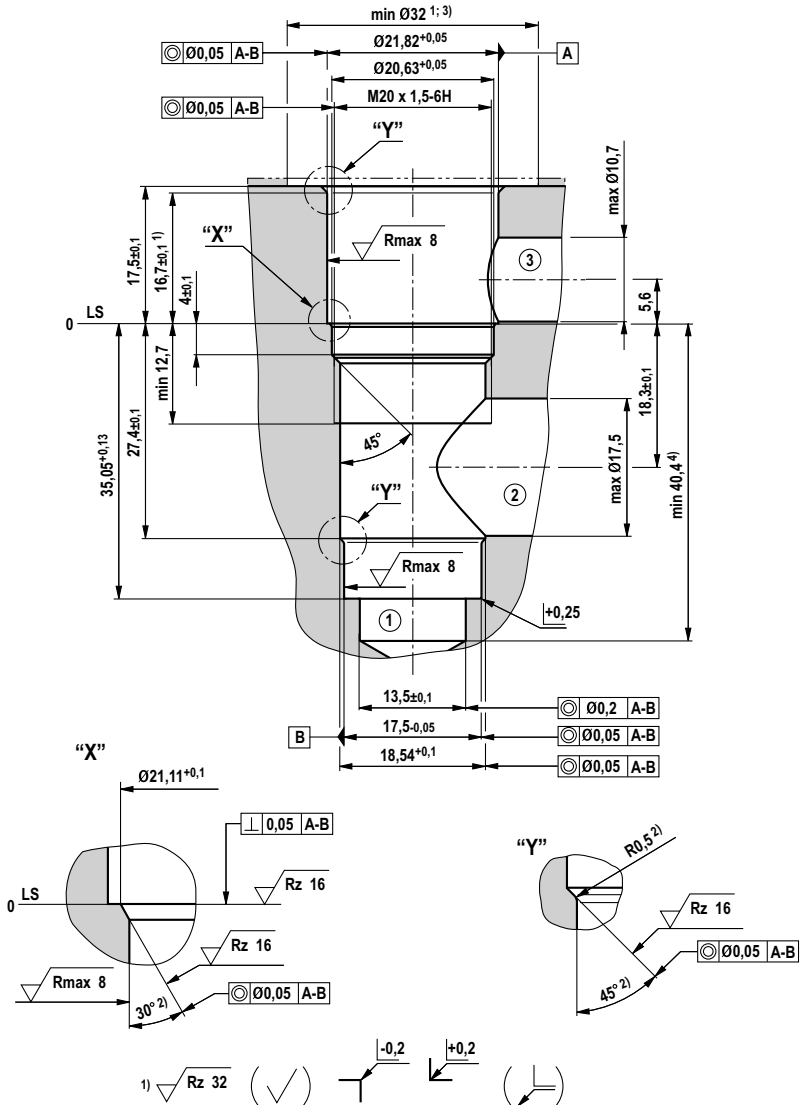
Unit dimensions (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque $M_A = 45$ to 50 Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}$ Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

- ① = Main port 1
- ② = Main port 2
- ③ = Main port 3
- LS = Location shoulder

Mounting cavity R/T-11A; 3 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-11A

2) All seal ring insertion faces are rounded and free of burrs

3) With counterbore

4) Depth for moving parts

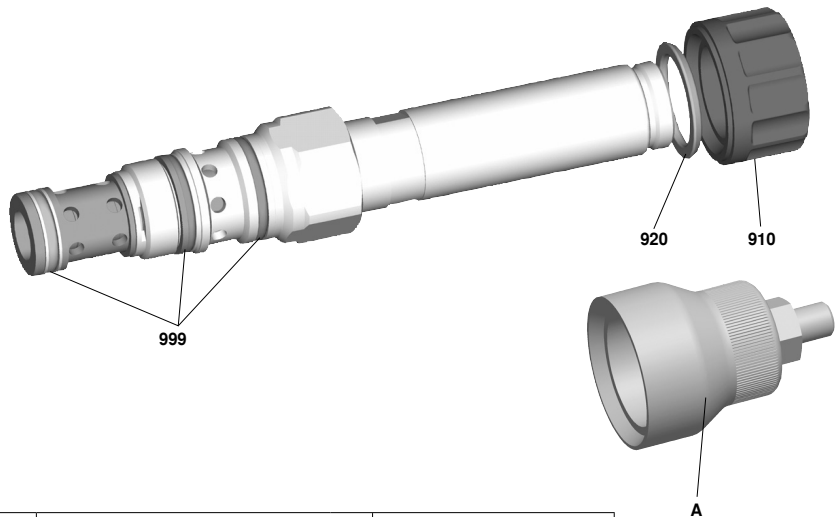
① = Main port 1

② = Main port 2

③ = Main port 3

LS = Location shoulder
Tolerance for all angles
 $\pm 0,5^\circ$

Available individual components



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003235
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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4/2 directional spool valve direct operated with solenoid actuation

RE 18136-05/06.12 1/10
Replaces: 10.09

Type KKDE (high-performance)

Component size 1
Component series A
Maximum operating pressure 350 bar
Maximum flow 40 l/min



H6812

Table of contents

Content	Page
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Available spools	2
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Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5, 6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

Features

- Mounting cavity R/T-31A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code (Valve without coil) ¹⁾

KKDE	R	1		A	/	H		V	*
------	---	---	--	---	---	---	--	---	---

Directional spool valve, direct operated, electrically operated

Maximum operating pressure 350 bar = R

Component size = 1

4 main ports

Symbols

		= D
		= E
		= F

Further details in the plain text

Seal material
FKM seals
(other seals upon request)
Attention!
Observe compatibility of seals with hydraulic fluid used!

V =

N0 = without manual override
N9 = with concealed manual override ⁴⁾

H = High-performance and mounting cavity R/T-31A (see page 9)

A = Component series

Valve types (without coil) ¹⁾

Spool symbol	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
D	KKDER1DA/HN0V	R901070118	KKDER1DA/HN9V	R901070125
E	KKDER1EA/HN0V	R901070123	KKDER1EA/HN9V	R901070127
F	KKDER1FA/HN0V	R901070124	KKDER1FA/HN9V	R901070129

Available coils (separate order) ¹⁾

Direct voltage DC ³⁾	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil upon request

²⁾ Mating connectors (separate order), see RE 08006

³⁾ Other voltages upon request

⁴⁾ Screwable manual override "N10" possible
(Material no. **R901051231**, separate order)

Function, section, symbols

General

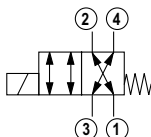
The 4/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

Function

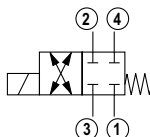
In the de-energized condition, control spool (5) is held in the initial position by the return spring (4). Control spool (5) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (D; E, and F). The main ports ①, ②, ③, and ④ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).

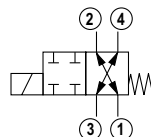
Symbol "D"



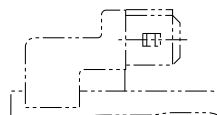
Symbol "E"



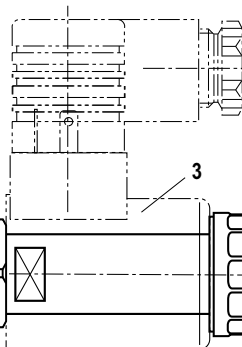
Symbol "F"



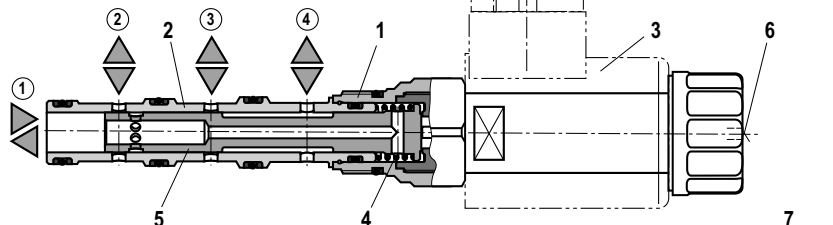
Version "C4"



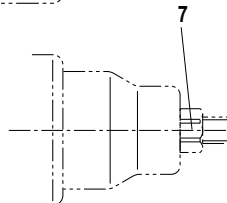
Version "K4"
(with mating connector)



Version "K40"



Type KKDER1EA/HN9V



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.35
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

hydraulic

Maximum operating pressure		bar	350 (at all ports)
Maximum flow		l/min	40
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles			10 million (at 350 bar)

electrical

Voltage type			Direct voltage
Supply voltage ²⁾		V	12DC; 24DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature ³⁾		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80
	– OFF	ms	≤ 50
Maximum switching frequency		cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"		IP 65 with mating connector mounted and locked
	– Version "C4"		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	– Version "K40"		IP 69K with mating connector mounted and locked

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

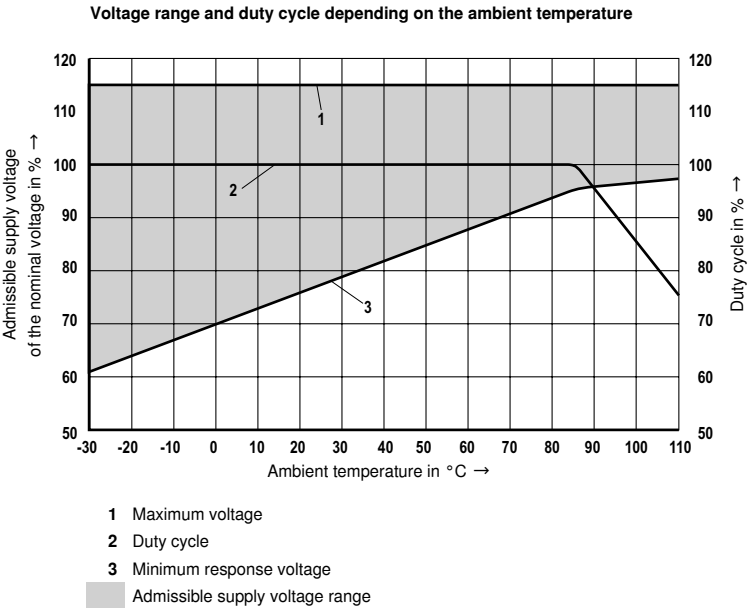
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

²⁾ Other voltages upon request

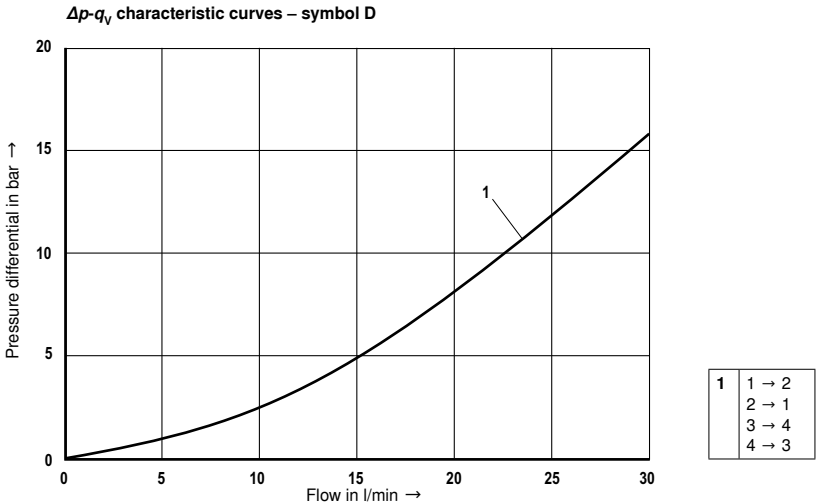
³⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

At the electrical connection "K4", the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

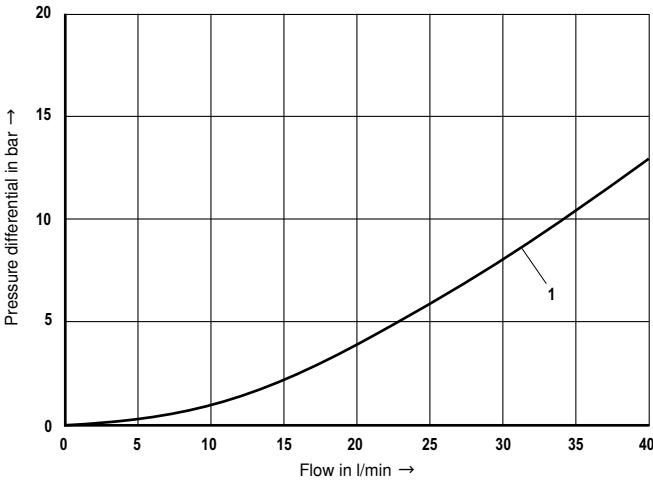


Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)



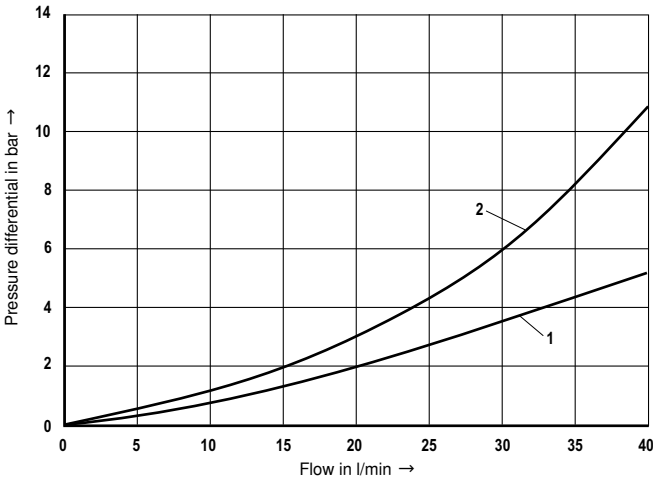
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 24 V coil)

$\Delta p\text{-}q_v$ characteristic curves – symbol E



1	1 → 2
	3 → 4
	2 → 1
	4 → 3

$\Delta p\text{-}q_v$ characteristic curves – symbol F



1	1 → 2
	2 → 1
2	3 → 4
	4 → 3

Performance limits (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)

Attention!

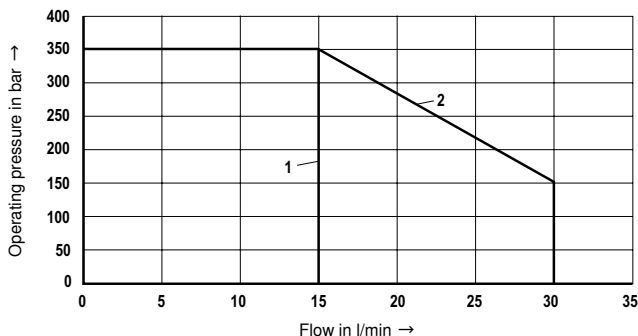
The specified performance limits are valid for operation with two directions of flow (e.g. symbol D: ① to ② and simultaneous return flow from ④ to ③).

Due to the flow forces acting within the valves, the permissible performance limit may be considerably lower with

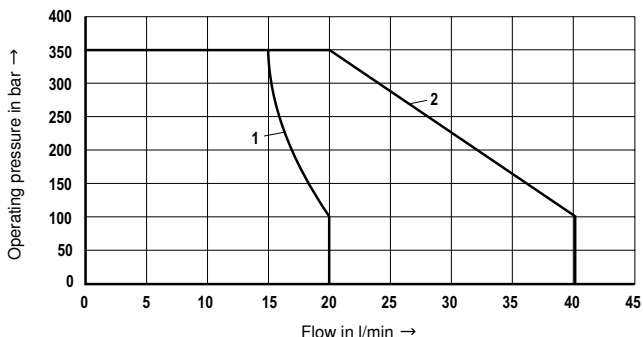
only one direction of flow (e. g. from ① to ② while port B is blocked)! In such cases, please consult us!

The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage and without tank pre-loading.

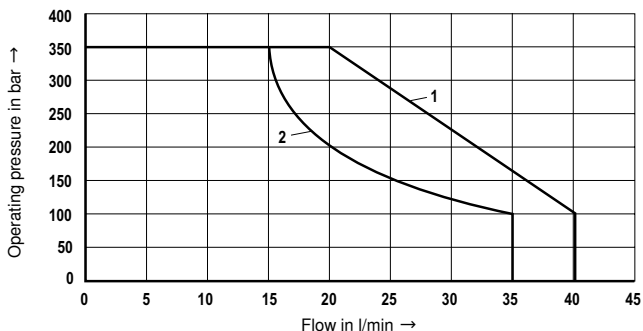
Symbol D

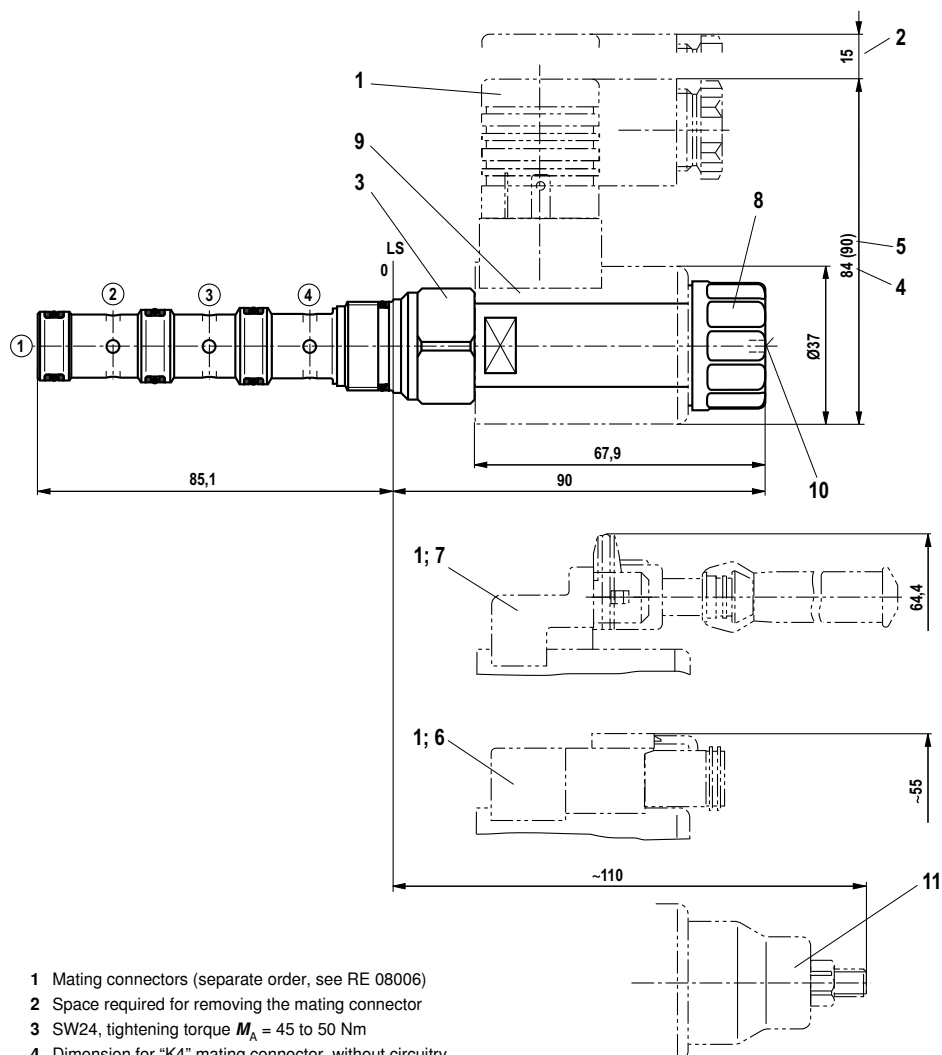


Symbol E



Symbol F

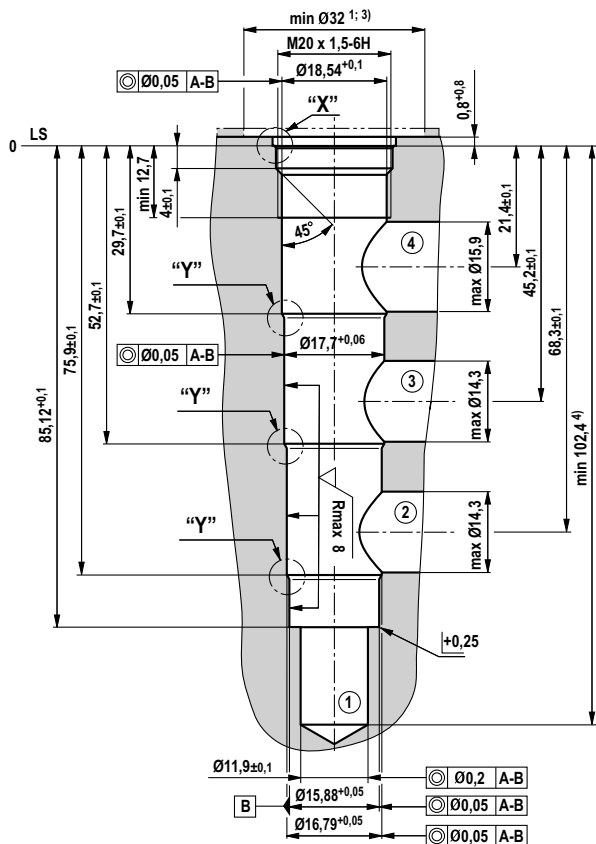


Unit dimensions (dimensions in mm)

- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque $M_A = 45$ to 50 Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}$ Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

- ① = Main port 1
- ② = Main port 2
- ③ = Main port 3
- ④ = Main port 4
- LS = Location shoulder

Mounting cavity R/T-31A; 4 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-31A

2) All seal ring in section faces are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

① = Main port 1

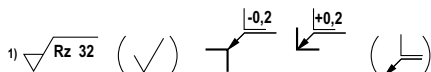
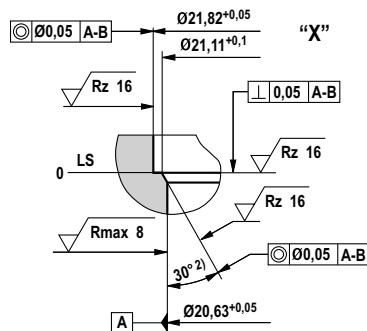
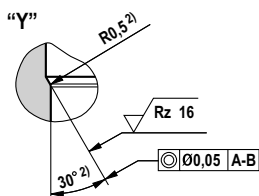
② = Main port 2

③ = Main port 3

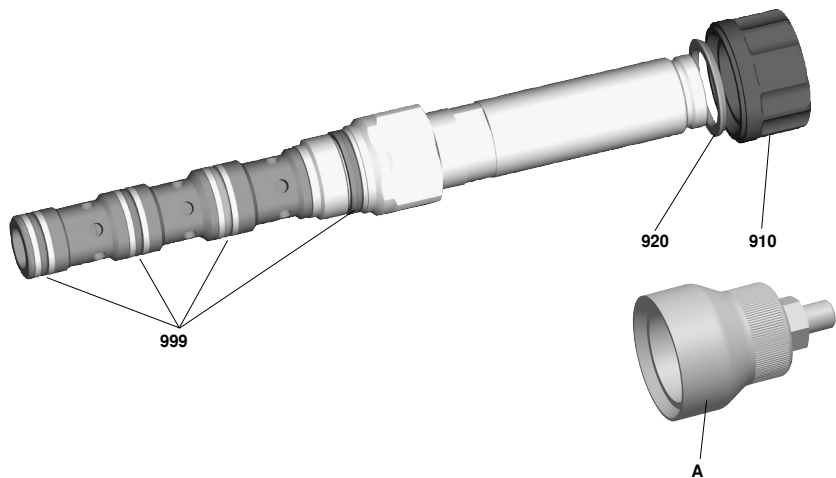
④ = Main port 4

LS = Location Shoulder

Tolerance for all angles $\pm 0,5^\circ$



Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003413
A	Manual override "N10" ¹⁾	R901051231

Coils, separate order, see page 2

¹⁾ Only with ordering code "N9", see page 2

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

5/3 directional spool valve, direct operated, with solenoid actuation

Type VEDS..53

RE 18158

Edition: 2012-05



H7899

- ▶ Frame size 10
- ▶ Component series 0
- ▶ Maximum operating pressure 250 bar
- ▶ Maximum flow 25 l/min

Features

- ▶ Mounting cavity R/UNF10-05-0-08
- ▶ Wet-pin DC solenoids
- ▶ Rotatable solenoid coil
- ▶ Manual override optional
- ▶ Integrated load-sensing port

Contents

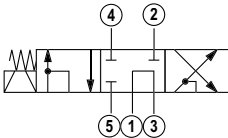
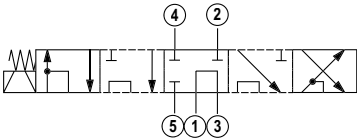
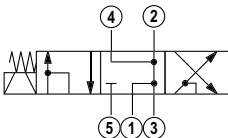
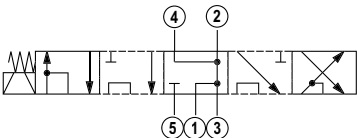
Features	1
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Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09	10	11	12			
VEDS	-	10A	-	53				OD53		54	KK2		0	0

01	Directional spool valve, direct operated	VEDS
02	Frame size 10	10A
03	5/3 directional design	53

Symbols

04			10
			20
05	Without manual override		0
	With pull/push manual override		-M1
06	5/3 directional spool valve, direct operated, with solenoid actuation		OD53

Symbols

07	See item 04	10
		20
08	Frame size 10: R/UNF 10-05-0-08, see page 9	54
09	On/off valve with 2 coils	KK2
10	Without manual override	0
	With pull/push manual override	1
11	Standard version	0
12	Revision status	0

Valve types (without coil) ¹⁾

Symbol	Without manual override "0"			With pull/push manual override "-M1", "1"		
	Type		Material no.	Type		Material no.
10	VEDS-10A-5310	OD531054KK2000	R901274118	VEDS-10A-5310-M1	OD531054KK2100	R901300057
20	VEDS-10A-5320	OD532054KK2000	R901274117	VEDS-10A-5320-M1	OD532054KK2100	R901300059

Available coils (separate order) ¹⁾

Direct voltage DC ³⁾	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

¹⁾ Complete valves with mounted coil on request.²⁾ Mating connectors, separate order, see data sheet 08006.³⁾ Other voltages upon request.

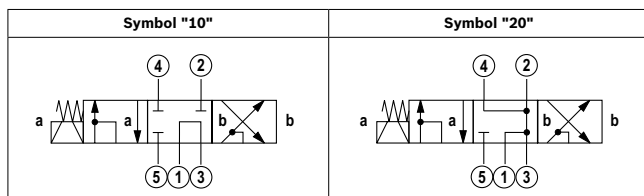
Function, section, symbols

General

The 5/3 directional spool valves are direct operated, pressure-compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise of pole tube (1), socket (2), a control spool (5) as well as of a return spring (4).

Function

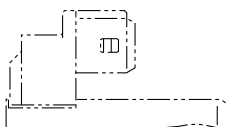
In the de-energized condition, the control spool (5) is held in the initial position by the return spring (4). The control spool (5) is actuated by wet-pin DC solenoids (3.1; 3.2). The symbols are realized by different spools ("10"; "20"). Main ports ①; ②; ③; ④ and ⑤ can be permanently pressurized with an operating pressure of 250 bar. The ports have a fixed pin assignment (see symbols). The manual override (6) allows for the switching of the valve without solenoid energization.



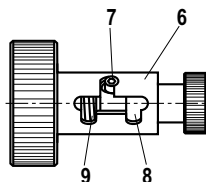
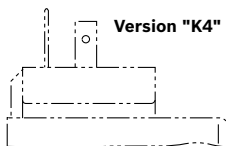
- ① = Main port 1 (LS)
- ② = Main port 2 (A)
- ③ = Main port 3 (T)
- ④ = Main port 4 (B)
- ⑤ = Main port 5 (P)

- 7 Initial position
- 8 Spool position "b"
- 9 Spool position "a"

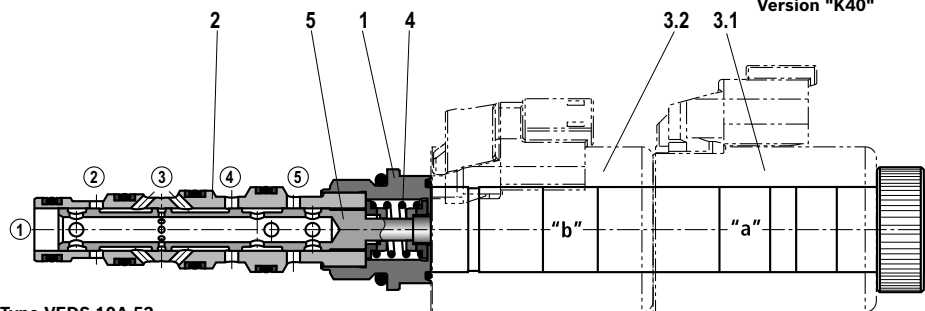
Version "C4"



Version "K4"



Version "K40"



Type VEDS-10A-53...

Technical data

(For applications outside these parameters, please consult us!)

general			
Weight	– Valve	kg	0.35
	– Coil	kg	0.25 each
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.	
Ambient temperature range		°C	–40 to +110 (see page 6)
Storage temperature		°C	–20 to +80

Environmental audits

Salt spray test according to DIN 50021	h	720
Surface protection DC solenoids		Coating according to DIN 50962-Fe//ZnNi with thick film passivation

hydraulic		
Maximum operating pressure	bar	250
Maximum flow	l/min	25
Leakage	ml/min	< 60 (with $\Delta p = 250$ bar; HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid	See table below	
Hydraulic fluid temperature range	°C	–40 to +80
Viscosity range	mm ² /s	5 to 1000 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 ¹⁾	
Load cycles	2 million	

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	

**Important information on hydraulic fluids!**

► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!

► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

► **Bio-degradable:** When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

Technical data

(For applications outside these parameters, please consult us!)

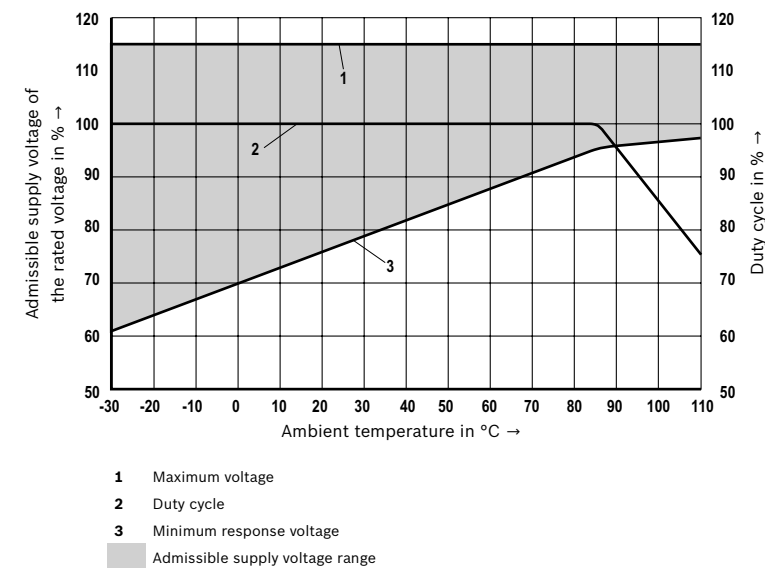
electric			
Voltage type		Direct voltage	
Supply voltages ²⁾		V 12 DC; 24 DC	
Voltage tolerance against ambient temperature		See characteristic curve below	
Power consumption		W 22	
Duty cycle		% See characteristic curve below	
Maximum coil temperature ³⁾		°C 150	
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 60
	– OFF	ms	≤ 60
Maximum switching frequency		cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"		IP 65 with mating connector mounted and locked
	– Version "C4"		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (material no. R901022127)
	– Version "K40"		IP 69K with mating connector mounted and locked

- ²⁾ Other voltages upon request
- ³⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

When establishing the electrical connection, the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

Voltage tolerance against ambient temperature; duty cycle

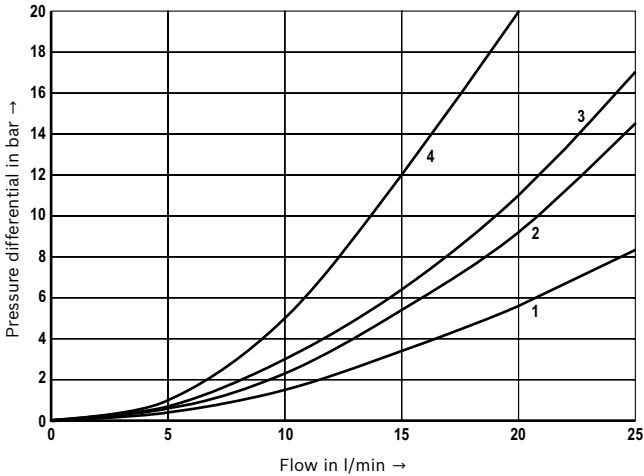
Voltage range and duty cycle depending on the ambient temperature



Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Δp - q_v characteristic curves – Symbol "10" and "20"

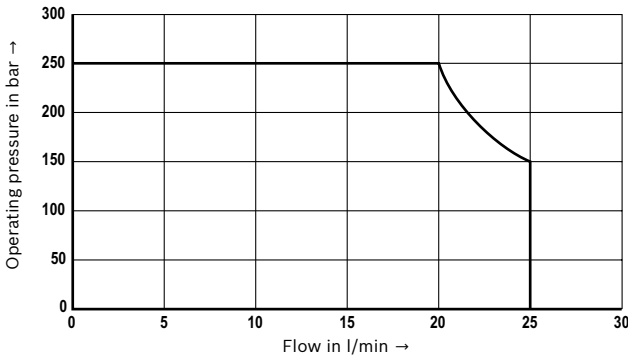


1	⑤ → ②
2	⑤ → ④
3	⑤ → ③
4	① → ③

Limits of performance

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Symbol "10" and "20"



⚠ Attention!

The specified limits of performance are valid for operation with two directions of flow (e.g. from ⑤ to ② and simultaneous return flow from ④ to ③).

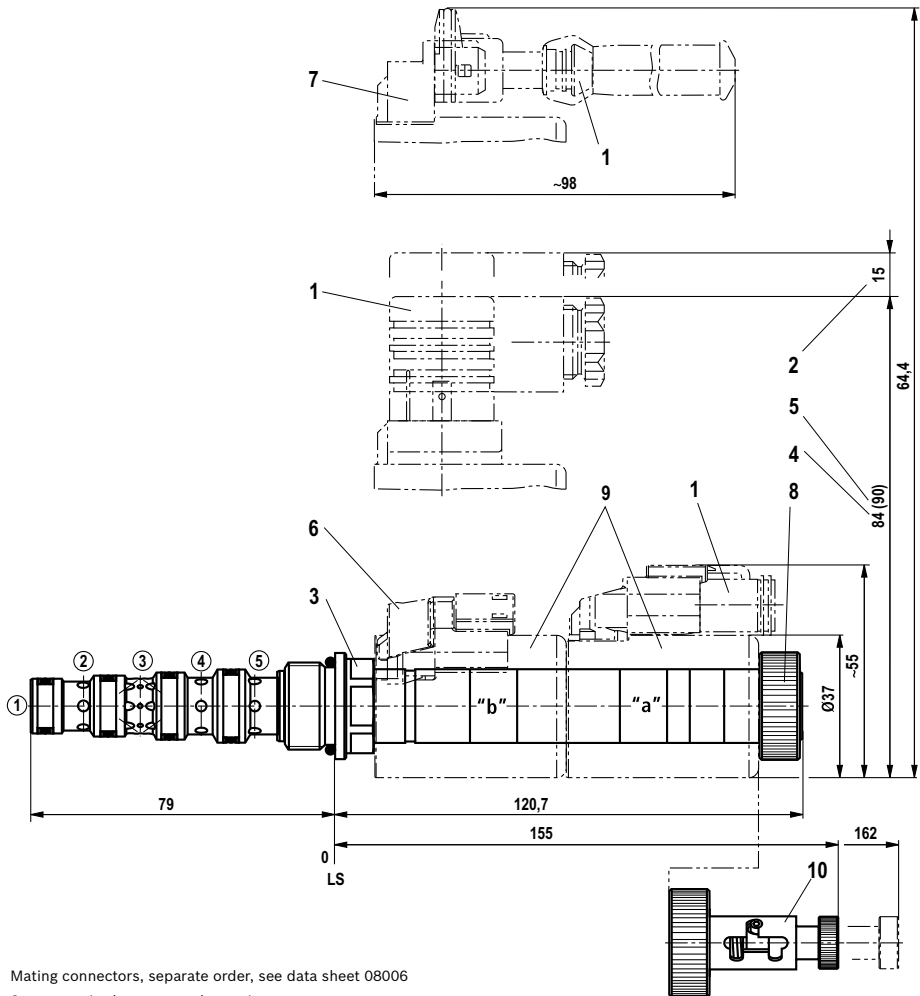
Due to the current forces acting within the valves, the permissible performance limit may be considerably lower with only one direction of flow (e.g. from ⑤ to ② and blocked port ④)!

In such applications, please consult us!

The performance limit was determined when the solenoids were at operating temperature, at 10% undervoltage and without tank pre-loading.

Unit dimensions

(dimensions in mm)

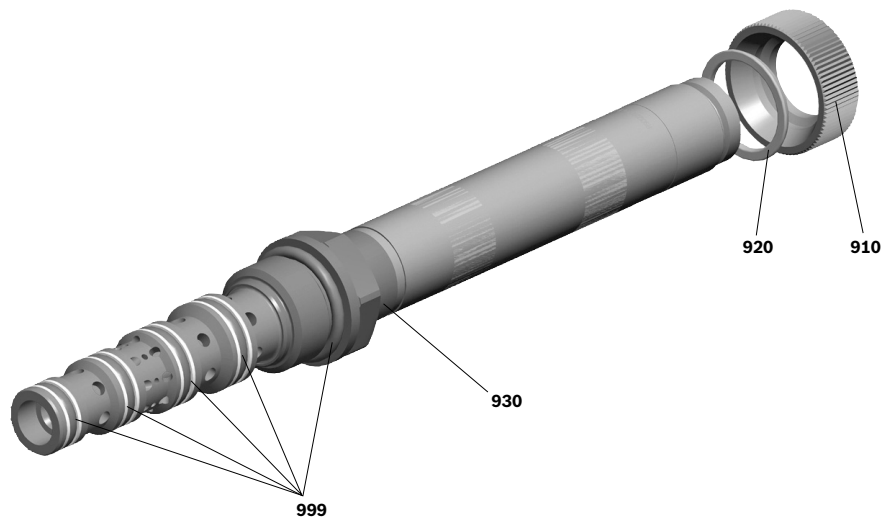


- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque $M_A = 55^{+5}$ Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}$ Nm
- 9 Coil (separate order, see page 3)
- 10 Pull/push manual override "1"

- ① = Main port 1 (LS)
- ② = Main port 2 (A)
- ③ = Main port 3 (T)
- ④ = Main port 4 (B)
- ⑤ = Main port 5 (P)

LS = Location Shoulder

Available individual components



Item	Denomination	Material no.
910	Nut	R901241052
920	O-ring for pole tube	R900007769
930	O-ring for pole tube	R913014944
999	Seal kit of the valve	R961005837

Coils, separate order, see page 3

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High Pressure Cartridge Valves

Electro-proportional

Designation	Description	Cavity	Data sheet	Pages
Proportional pressure relief valve, direct operated, rising characteristic curve	KBPS.8A	T-8A	RE 18139-04	1043
Proportional pressure relief valve, direct operated, falling characteristic curve	KBPS.8B	T-8A	RE 18139-05	1057
Proportional pressure relief valve, pilot operated, rising characteristic curve	KBVS.1A	Size 10	RE 18160	1071
Proportional pressure relief valve, pilot operated, falling characteristic curve	KBVS.1B	Size 10	RE 18152	1083
Proportional pressure relief valve, pilot operated, rising characteristic curve	KBVS.3A	Special	RE 18139-08	1095
Proportional pressure relief valve, pilot operated, falling characteristic curve	KBVS.3B	Special	RE 18139-07	1107
Proportional flow control valve, with integrated pressure compensator	KUDSR.3	Size 16	RE 18702	1119
Proportional 4/3 direct operated with solenoid actuation	VEPS-10A-43	Size 10	RE 18162	1133
Plug- in proportional amplifier	VT-SSPA		RE 30116	1149

Proportional pressure relief valve, direct operated, increasing characteristic curve

RE 18139-04/06.12 1/14
Replaces: 11.11

Type KBPS.8A (High Performance)

Component size 8
Component series A
Maximum operating pressure 420 bar
Maximum flow 2 l/min



H7071

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Features
Ordering code
Preferred types
Function, section, symbol
Technical data
Characteristic curves
Minimum terminal voltage at the coil and relative duty cycle
Unit dimensions
Mounting cavity
Available individual components

Features

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1	– Cartridge valve	
2	– Mounting cavity R/T-8A	
2	– Direct operated proportional valve for limiting a system pressure	
2	– Suitable for mobile and industrial applications	
3	– Operation by means of proportional solenoid with central thread and detachable coil	
4, 5	– Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics	
6 to 9	– In case of power failure, minimum set pressure	
10, 11	– Control electronics:	Data sheet
12	• Plug-in proportional amplifier type VT-SSPA1...	30116
13	• Analog amplifier type RA...	95230
14	• BODAS controller type RC...	95200

Information on available spare parts:
www.boschrexroth.com/spc

Preferred types

Type	Material number
KBPSC8AA/HCG24K4V	R901049804
KBPSF8AA/HCG24K4V	R901049817
KBPSL8AA/HCG24K4V	R901027408
KBPSN8AA/HCG24K4V	R901049877
KBPSP8AA/HCG24K4V	R901047007
KBPSR8AA/HCG24K4V	R901049860
KBPST8AA/HCG24K40V	R901045871
KBPSL8AA/HCG24K4V-8	R901053398
KBPSP8AA/HCG24C4V-8	R901132980
KBPSR8AA/HCG24C4V-8	R901128882

KBPS	8	A	A/H	C			V	*
= B = C = F = H = L = N = P = R = T = 8 Command value = 0 = A Counting cavity R/T-8A = H pin = C							V = Observe with K4 = K40 = with connector D C4 = with conn	no code -8 =

¹⁾ Mating connectors, separate order, see data sheet 08006.

G12 = Control electronics 12 V DC
G24 = Control electronics 24 V DC

Function, section, symbol

General

Valves of type KBPS.8A are direct operated proportional pressure relief valves (pilot control valves) in seat design and are used to limit a system pressure. They basically comprise of the pulse tube (3), the solenoid coil (4), the valve seat (5) and the valve poppet (6).

With command value 0 or in case of power failure, the minimum pressure is set. Operation by means of a proportional solenoid with central thread and detachable coil. The solenoid's interior is connected to the main port ② and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to continuously set the system pressure to be limited.

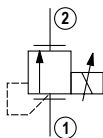
Basic principle

For the setting of the system pressure, a command value is specified at the control electronics. Depending on the command value, the electronics necessary for operation actuate the solenoid with electric current. The proportional solenoid converts the electric current into mechanical force that acts on the valve poppet (6) via the armature plunger. The valve poppet (6) pushes onto the valve seat (5) and blocks the connection between main port ① and ②. If the hydraulic force on the valve poppet (6) corresponds to the solenoid force, the valve controls the set pressure by lifting the valve poppet (6) off the valve seat (5) and thus enabling hydraulic fluid flow from main port ① to ②. If the command value is zero, the minimum pressure is set.

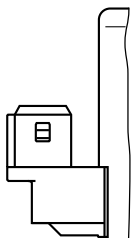
Notice!

Occurring tank pressures (main port ②) are added up to the set values in the main port ①.

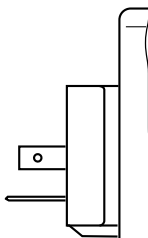
Symbol



Version
"C4"

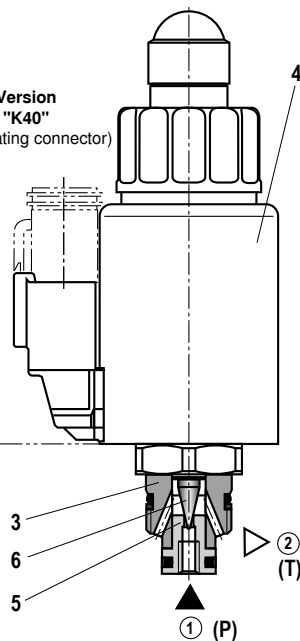


Version
"K4"



Version
"K40"

(with mating connector)



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	kg	0.45
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

Environmental audits:

Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)

DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g ² /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shocking	Half sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 individual shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms, 1000 x in positive, 1000 x in negative direction (a total of 2000 individual shocks)

Indication per axis

Climatic test according to EN 60068-2 / IEC 60068-2 (environmental test):

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h

Salt spray test: 720 h according to DIN 50021

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

hydraulic

Maximum operating pressure ¹⁾ (Main port ①)	bar	420
Maximum admissible return flow pressure (main port ②)	bar	210
Maximum set pressure ²⁾		See command value pressure characteristic curves page 6
Minimum set pressure with command value 0		See characteristic curves page 8 and 9
Maximum flow	l/min	2 (see characteristic curves page 6 and 7)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm ² /s	15 to 380
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ³⁾

¹⁾ **Attention!** The maximum operating pressure is the total of set pressure and return flow pressure!

²⁾ If the valve is installed in a mounting cavity made of non-magnetically conductive material, the maximum set pressure is < 3 % lower.

Attention! The valves are set in the factory. In case of subsequent adjustment, the warranty will become invalid!

³⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)**hydraulic**

Hysteresis ⁴⁾		< 5 % of the max. set pressure
Range of inversion ⁴⁾		< 0.5 % of the max. set pressure
Response sensitivity ⁴⁾		< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %	< 5 % of the max. set pressure
	– Command value 0	< 2 % of the max. set pressure
Step response ($T_u + T_d$) 0 → 100 % and/or 100 % → 0	ms	70 (depending on the system)

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	
 Important information on hydraulic fluids!				
▶ For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!			▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.	
▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!			▶ Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.	

electric

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC	
Maximum control current	mA	1760	1200	800	
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8	11.5
	– max. hot value	Ω	3.8	7.9	18.9
Switch-on duration	%	100 ⁵⁾			
Maximum coil temperature ⁶⁾	°C	150			
Protection class according to DIN EN 60529	– Version "K4"	IP 65 with mating connector mounted and locked			
	– Version "K40"	IP 69K with mating connector mounted and locked			
	– Version "C4"	IP 66 with mating connector mounted and locked			
		IP 69K with Rexroth mating connector (Material no. R901022127)			
Control electronics (separate order)		– Plug-in proportional amplifier type VT-SSPA1..., see data sheet 30116 – Analog amplifier type RA..., see data sheet 95230 – BODAS controller type RC..., see data sheet 95200			
Design according to VDE 0580					

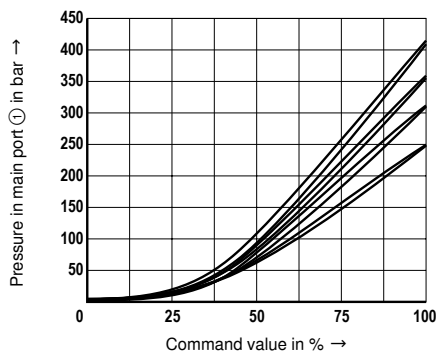
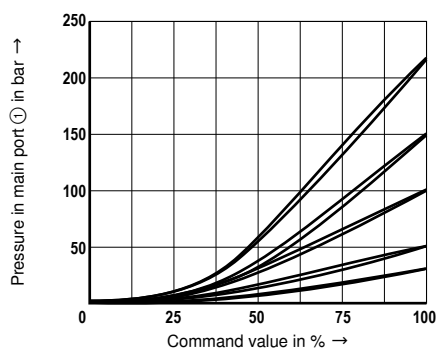
⁴⁾ Measured with analog amplifier type RA2-1/10, see data sheet 95230

⁵⁾ In case of use more than 2000 m a.s.l., please consult us.

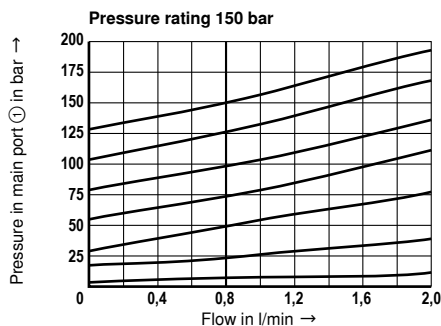
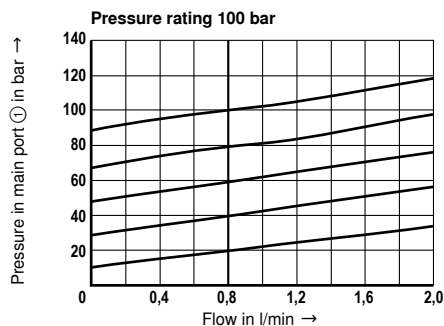
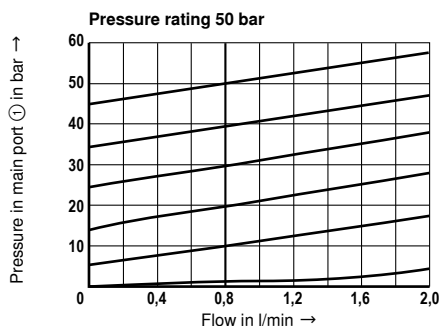
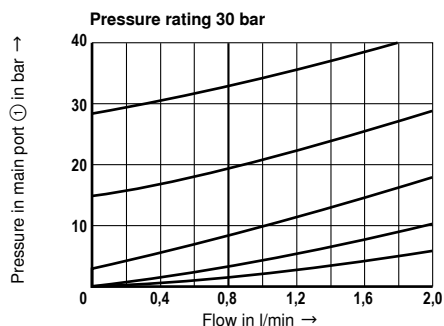
⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

In the electrical connection, the protective earthing conductor (PE ≡) must be connected properly.

Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Pressure in the main port ① depending on the command value. Flow = 0.8 l/min

Pressure in the main port ① depending on the flow.

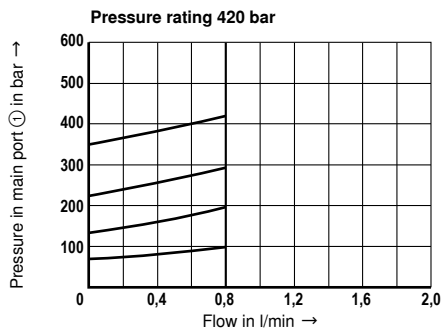
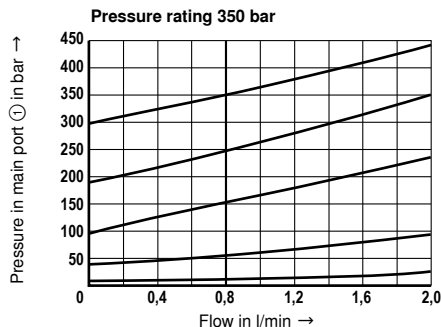
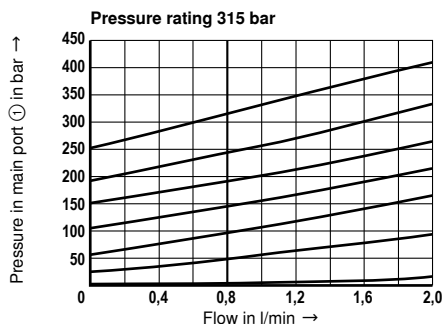
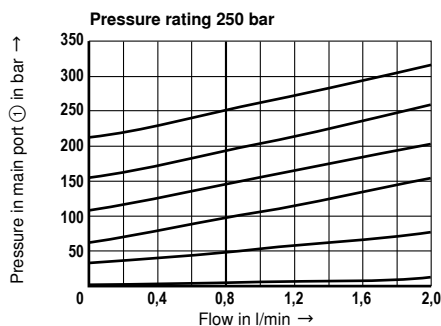
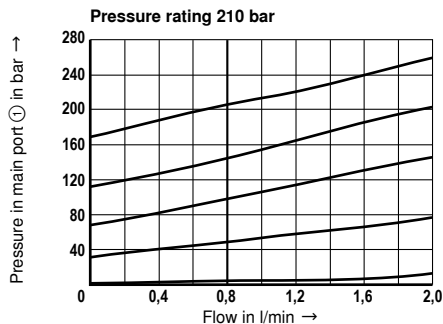
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measures with HLP46, $\vartheta_{\text{Oil}} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)

Pressure in the main port ① depending on the flow.

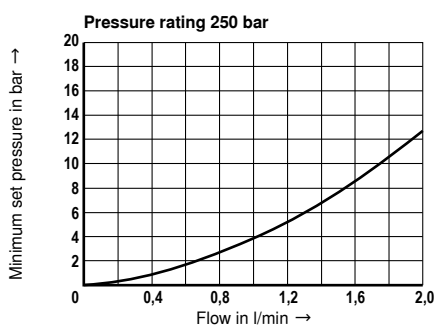
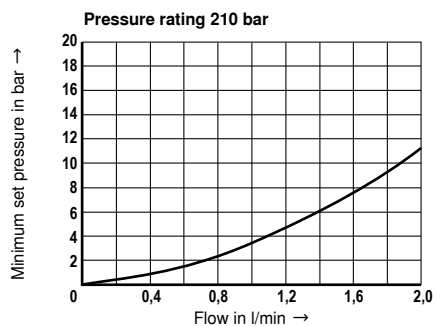
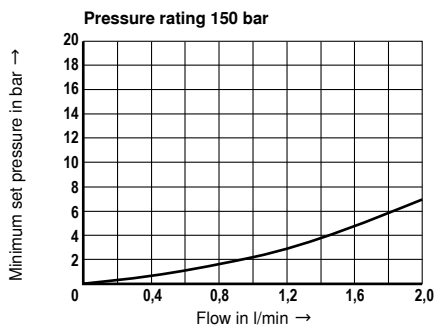
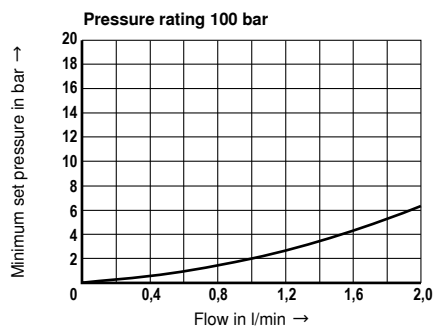
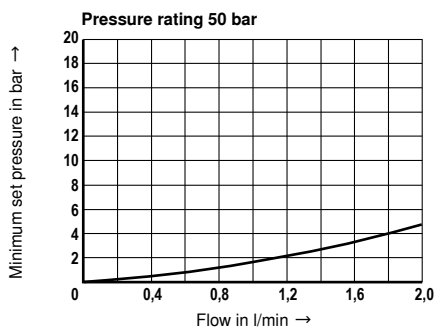
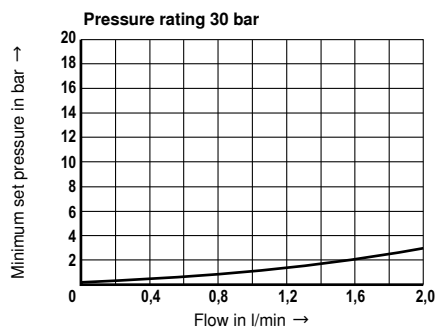
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Minimum set pressure in main port ① with command value 0.

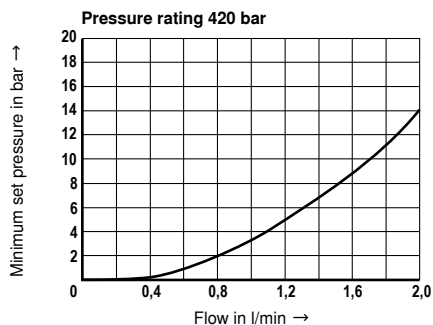
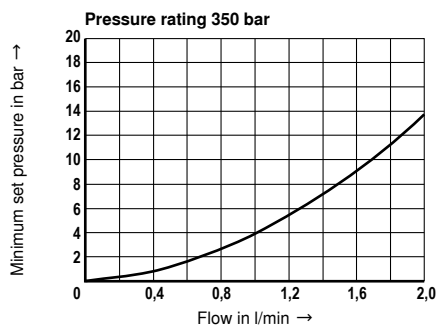
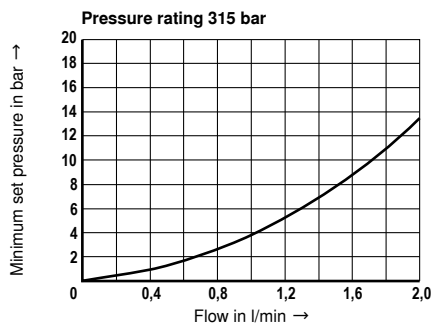
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

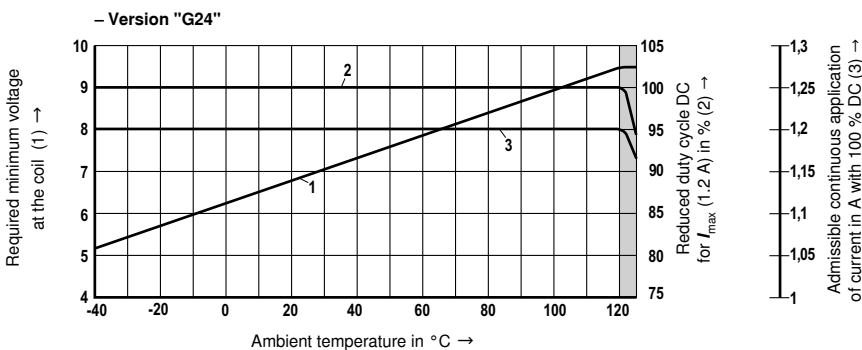
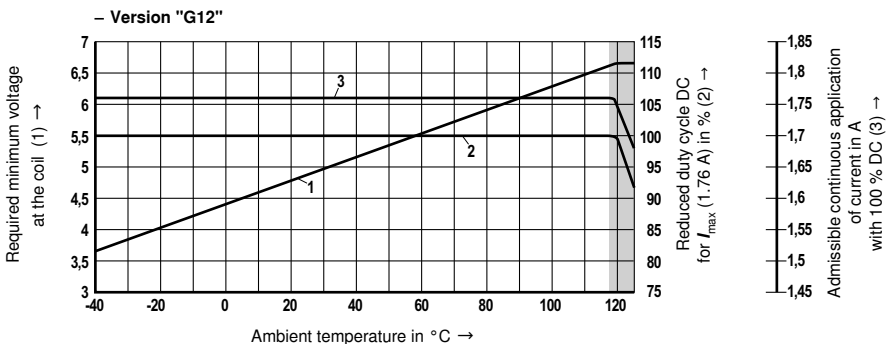
Minimum set pressure in main port ① with command value 0.

(The characteristic curve was measure without counter pressure in main port ②.)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

Notice!

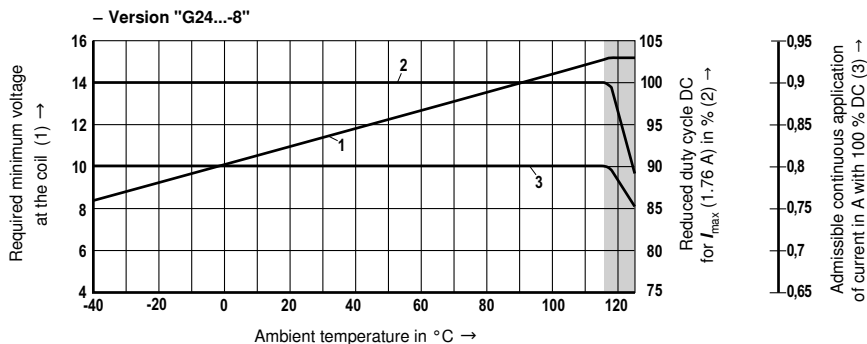
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

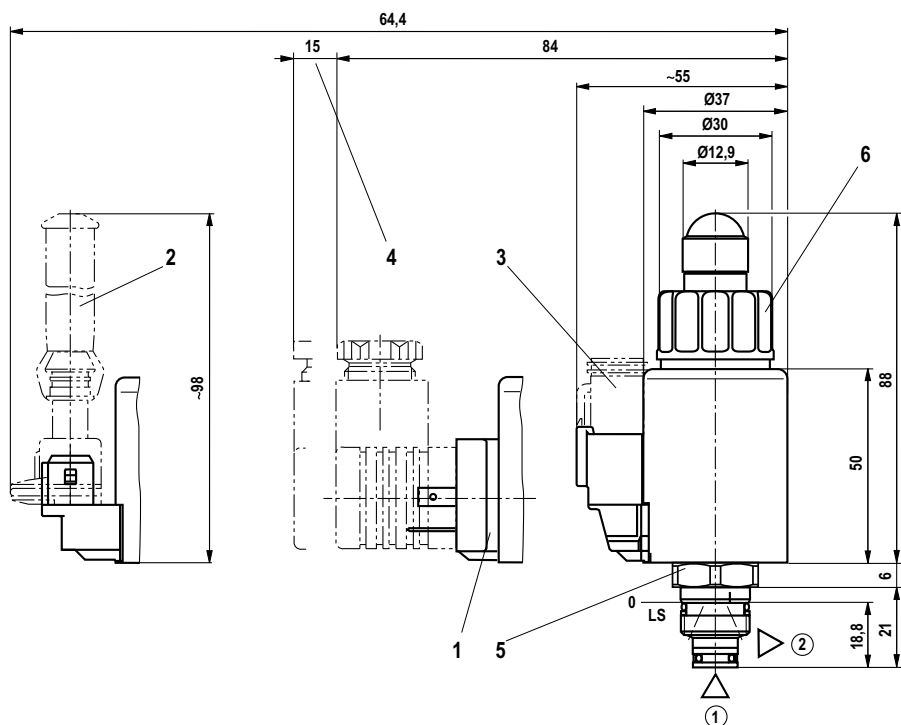


Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions (dimensions in mm)

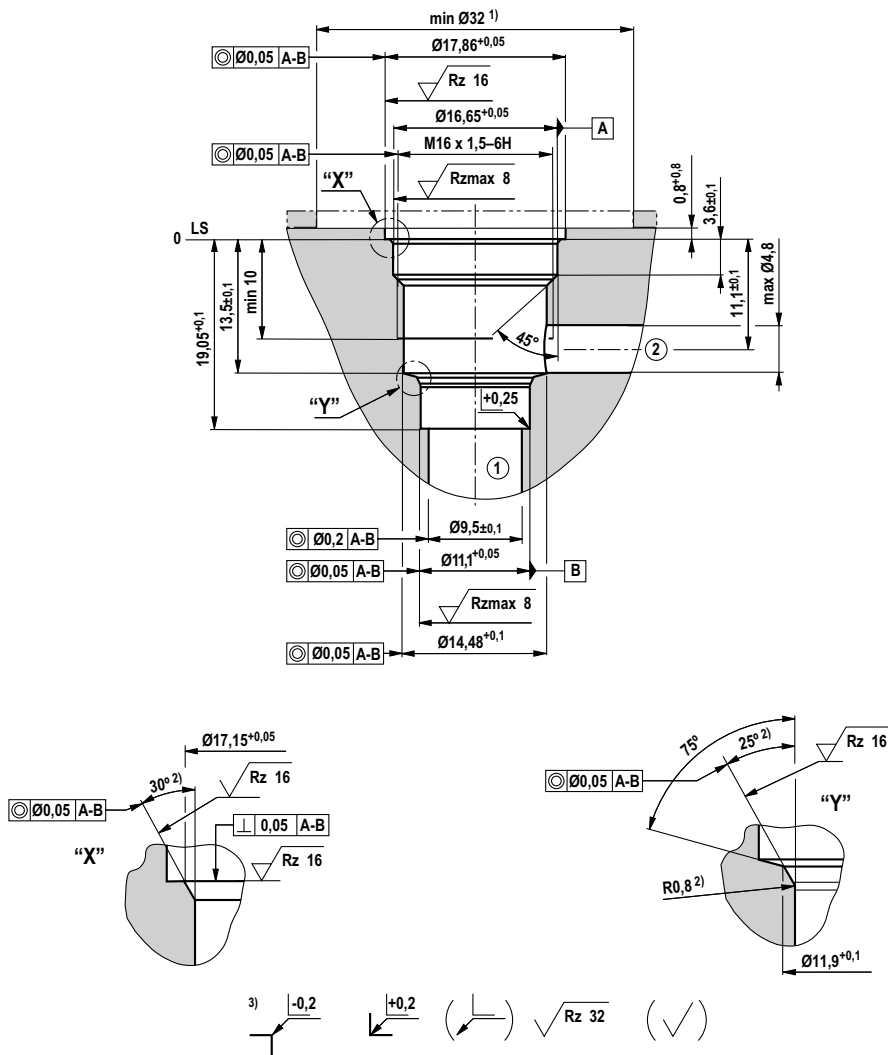
① = Main port 1

② = Main port 2

LS = Location Shoulder

- 1 Mating connector for connector "K4"
(separate order, see data sheet 08006)
- 2 Mating connector for connector "C4"
(separate order, see data sheet 08006)
- 3 Mating connector for connector "K40"
(separate order, see data sheet 08006)
- 4 Space required to remove the mating connector
- 5 Hexagon SW22 for screwing in the
pole tube; tightening torque $M_A = 40^{+6}$ Nm
- 6 Solenoid nut, tightening torque $M_A = 5^{+1}$ Nm

Mounting cavity R/T-8A; 2 main ports; thread M16 x 1.5-6H (dimensions in mm)



¹⁾ With counterbore, deviating from T-8A

²⁾ All seal ring insertion faces are rounded and free of burrs

³⁾ Deviating from T-8A

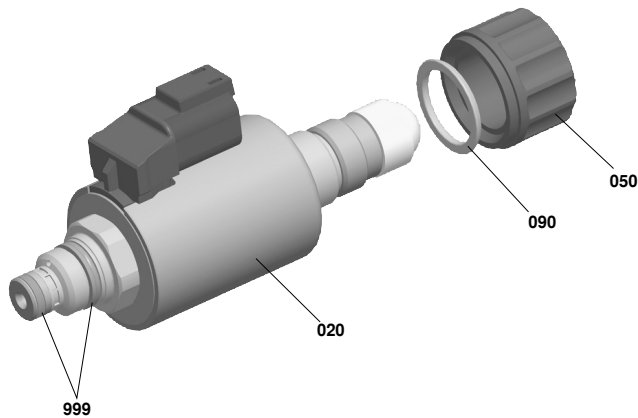
① = Main port 1

② = Main port 2

LS = Location Shoulder

Tolerance for all angles $\pm 0,5^\circ$

Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection ¹⁾	Version "K4"	12 V	R901002932
			24 V	R901002319
			24 V / 800 mA	R901049962
		Version "K40"	12 V	R901003055
			24 V	R901003053
			24 V / 800 mA	R901050010
		Version "C4"	12 V	R901003044
			24 V	R901003026
			24 V / 800 mA	R901049963
050	Nut			R900992146
090	Seal ring for pole tube			R900007769
998	Seal kit of the valve			R961000376

¹⁾  **Notice!**
After exchange of the solenoid coil, the pressure set in the factory may change by ±5 %.

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Proportional pressure relief valve, direct operated, decreasing characteristic curve

RE 18139-05/07.12 1/14
Replaces: 11.11

Type KBPS.8B (High Performance)

Component size 8
Component series A
Maximum operating pressure 420 bar
Maximum flow 2 l/min



H7071

Table of contents

Contents	
Features	
Ordering code	
Preferred types	
Function, section, symbol	
Technical data	
Characteristic curves	
Minimum terminal voltage at the coil and relative duty cycle	
Unit dimensions	
Mounting cavity	
Available individual components	

Features

Page	Features	
1	– Cartridge valve	
2	– Mounting cavity R/T-8A	
2	– Direct operated proportional valve for limiting a system pressure	
2	– Suitable for mobile and industrial applications	
3	– Operation by means of proportional solenoid with central thread and detachable coil	
4, 5	– Fine adjustment of the command value pressure characteris- tic curve possible from the outside at the control electronics	
6 to 9	– Set to the maximum pressure via the adjustment screw	
10, 11	– In case of power failure, maximum set pressure	
12	– Control electronics:	Data sheet
13	• Plug-in proportional amplifier type VT-SSPA1...	30116
14	• Analog amplifier type RA...	95230
	• BODAS control unit type RC...	95200

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

KBPS		8	B	A / H	C			V		*
------	--	---	---	-------	---	--	--	---	--	---

Proportional pressure relief valve, direct operated (pilot control valve)

Pressure rating
 up to 30 bar = B
 up to 50 bar = C
 up to 100 bar = F
 up to 150 bar = H
 up to 210 bar = L
 up to 250 bar = N
 up to 315 bar = P
 up to 350 bar = R
 up to 420 bar = T

Component size 8 = 8

Maximum pressure with command value = 0 = B

Component series = A

High Performance and mounting cavity R/T-8A (see page 13) = H

Proportional solenoid, wet-pin = C

Further details in the plain text
no code = Standard
-8 = Coil 800 mA (see page 5)

Seal material
 V = FKM seals
 Attention!
 Observe compatibility of the seals with the hydraulic fluid used!

Electrical connection ¹⁾
K4 = Without mating connector, with connector according to DIN EN 175301-803
K40 = Without mating connector, with connector DT 04-2PA (Deutsch plug)
C4 = Without mating connector, with connector AMP Junior-Timer

Supply voltage
G12 = Control electronics 12 V DC
G24 = Control electronics 24 V DC

¹⁾ Mating connectors, separate order, see data sheet 08006.

Preferred types

Type	Material number
KBPSB8BA/HCG24C4V-8	R901144800
KBPSL8BA/HCG24C4V-8	R901120007
KBPSR8BA/HCG24C4V	R901018607
KBPSL8BA/HCG12C4V	R901056361
KBPSL8BA/HCG24C4V	R901018602
KBPSL8BA/HCG12K40V	R901064385
KBPSN8BA/HCG24K40V	R901016229
KBPSP8BA/HCG24K40V	R901026207
KBPSR8BA/HCG24K40V	R901188705
KBPSP8BA/HCG24K4V	R901018593

Function, section, symbol

General

Valves of type KBPS.8B are direct operated proportional pressure relief valves (pilot control valves) in seat design and are used to limit a system pressure. They basically comprise of the pole tube (3), the solenoid coil (4), the valve seat (5) and the valve poppet (6).

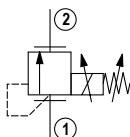
With command value 0 or in case of power failure, the maximum pressure is set. Operation by means of a proportional solenoid with central thread and detachable coil. The solenoid's interior is connected to the main port ② and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to continuously set the system pressure to be limited.

Basic principle

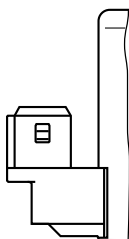
In the factory, the valves are mechanically set to the maximum pressure. For the proportional reduction of the system pressure, a command value is specified at the control electronics. Depending on the command value, the electronics actuate the solenoid with electric current.

The proportional solenoid converts the electric current into mechanical force that acts against the setting spring via the armature and thus reduces the force on the valve poppet (6). The valve poppet (6) pushes onto the valve seat (5) and blocks the connection between main port ① and ②. If the hydraulic force on the valve poppet (6) corresponds to the force difference between setting spring and solenoid force, the valve controls the set pressure by lifting the valve poppet (6) off the valve seat and thus enabling hydraulic fluid flow from main port ① to ②. If the command value is zero, the maximum pressure is set.

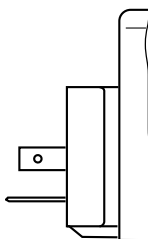
Symbol



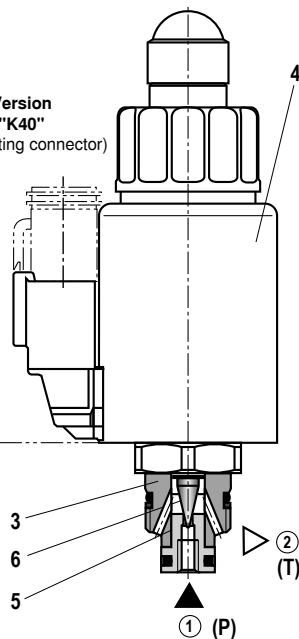
Version
"C4"



Version
"K4"



Version
"K40"
(with mating connector)



Notice!

Occurring tank pressures (main port ②) are added up to the set values in the main port ①.

Technical data (For applications outside these parameters, please consult us!)**general**

Weight	kg	0.45
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

Environmental audits:**Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)**

DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g ² /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shocking	Half sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 individual shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms, 1000 x in positive, 1000 x in negative direction (a total of 2000 individual shocks)

Indication per axis**Climatic test according to EN 60068-2 / IEC 60068-2 (environmental test):**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h

Salt spray test: 720 h according to DIN 50021

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

hydraulic

Maximum operating pressure ¹⁾ (main port ①)	bar	420
Maximum admissible return flow pressure (main port ②)	bar	210
Maximum set pressure ²⁾		See command value pressure characteristic curves page 6
Minimum set pressure with command value max ³⁾		See characteristic curves page 8 and 9
Maximum flow	l/min	2 (see characteristic curves page 6 and 7)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm ² /s	15 to 380
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ⁴⁾

¹⁾ **Attention!** The maximum operating pressure is the total of set pressure and return flow pressure!

²⁾ **Attention!** The valves are set in the factory. In case of subsequent adjustment, the warranty will become invalid!

³⁾ If the valve is installed in a mounting cavity made of non-magnetically conductive material, the minimum set pressure is slightly higher.

⁴⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)**hydraulic**

Hysteresis ⁵⁾		< 4 % of the max. set pressure
Range of inversion ⁵⁾		< 0.5 % of the max. set pressure
Response sensitivity ⁵⁾		< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %	< 2 % of the max. set pressure
	– Command value 0	< 5 % of the max. set pressure
Step response ($T_u + T_g$) 0 → 100 % and/or 100 % → 0	ms	70 (depending on the system)

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	
 Important information on hydraulic fluids!				
► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! ► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.				

electric

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC
Maximum control current	mA	1760	1200	800
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8
	– max. hot value	Ω	3.8	7.9
Switch-on duration	%	100 ⁶⁾		
Maximum coil temperature ⁷⁾	°C	150		
Protection class according to DIN EN 60529	– Version "K4"	IP 65 with mating connector mounted and locked		
	– Version "K40"	IP 69K with mating connector mounted and locked		
	– Version "C4"	IP 66 with mating connector mounted and locked IP 69K with Rexroth mating connector (material no. R901022127)		
Control electronics (separate order)		– Plug-in proportional amplifier type VT-SSPA1..., see data sheet 30116 – Analog amplifier type RA..., see data sheet 95230 – BODAS control unit type RC..., see data sheet 95200		
Design according to VDE 0580				

⁵⁾ Measured with analog amplifier type RA1-1/10, see data sheet 95230

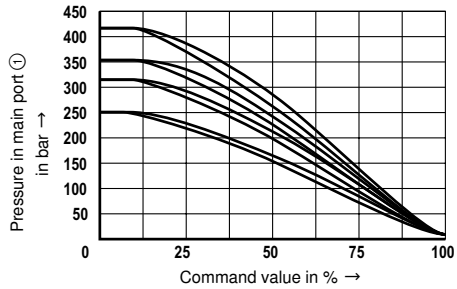
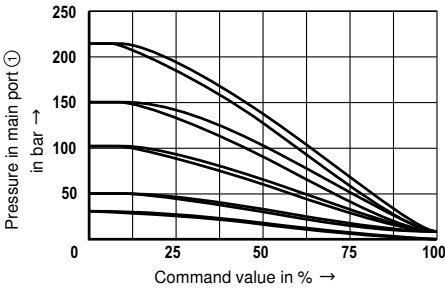
⁶⁾ In case of use more than 2000 m a.s.l., please consult us.

⁷⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

In the electrical connection, the protective earthing conductor (PE ≡) must be connected properly.

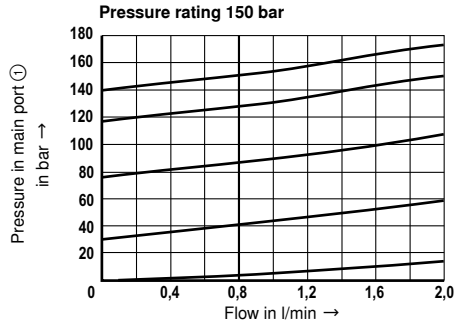
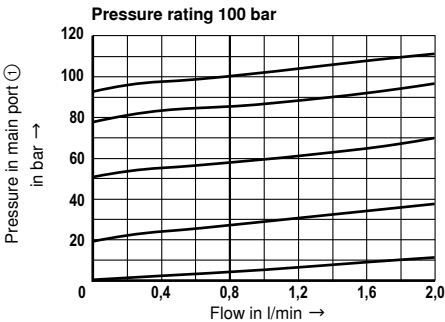
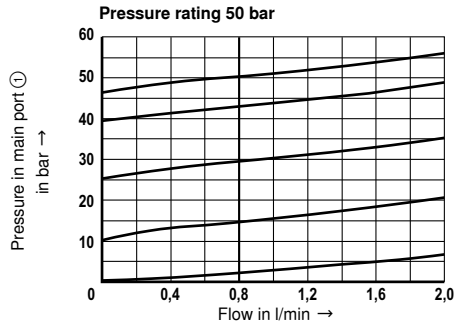
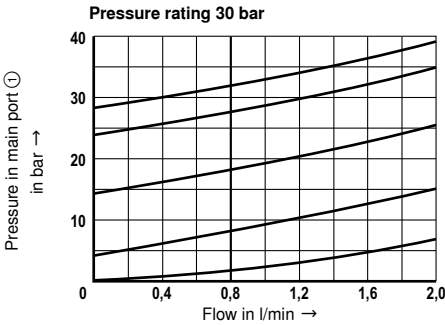
Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Pressure in main port ① depending on the command value. Flow = 0.8 l/min



Pressure in main port ① depending on the flow.

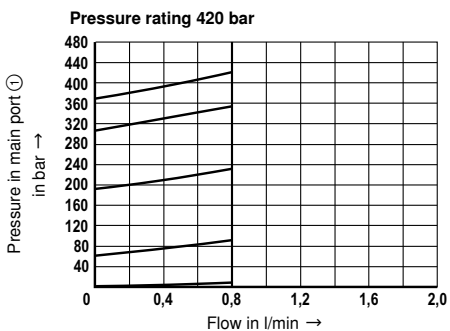
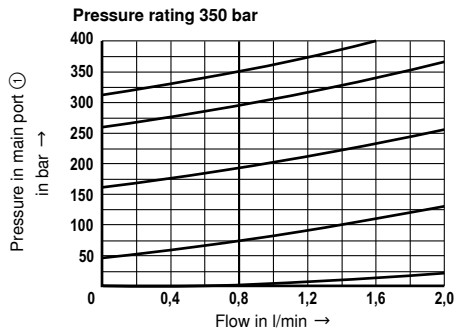
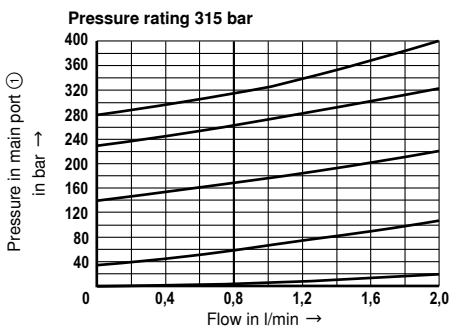
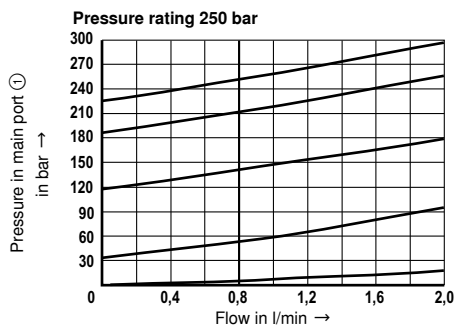
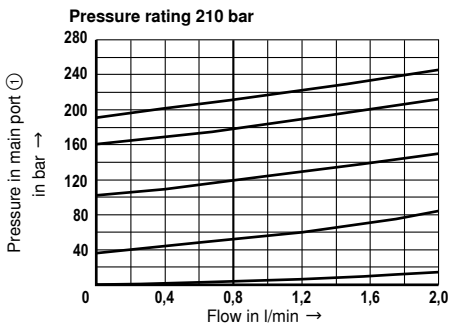
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measured with HLP46, $\vartheta_{Oil} = 40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 24 V coil)

Pressure in main port ① depending on the flow.

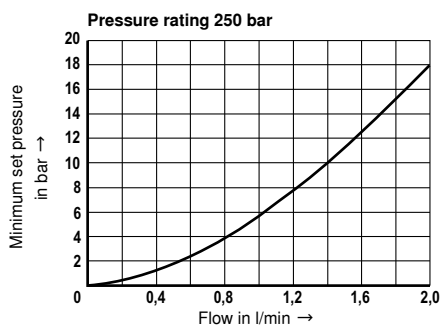
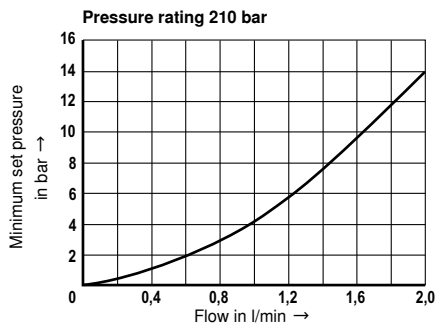
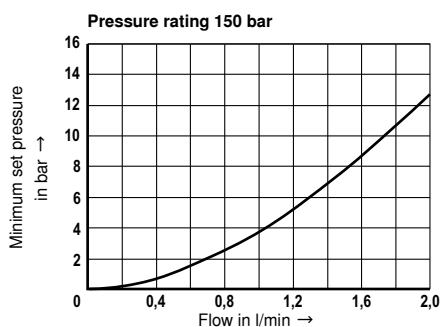
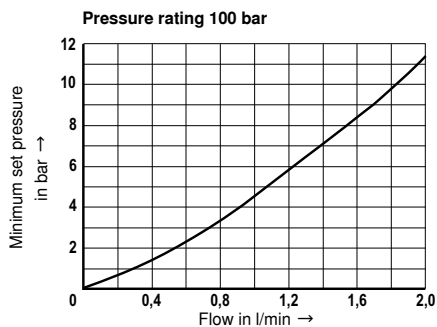
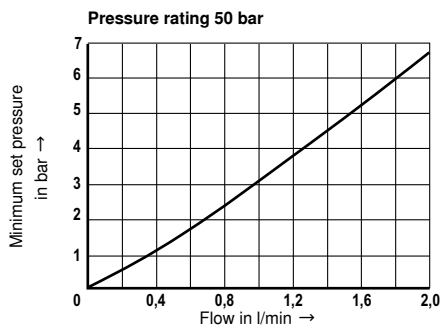
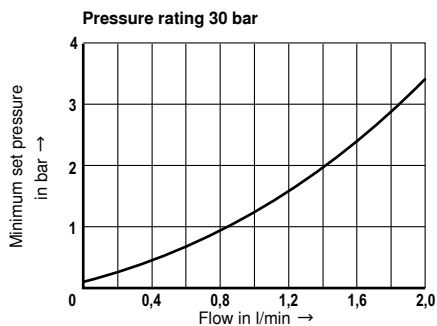
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Minimum set pressure in main port ① with command value 100 %.

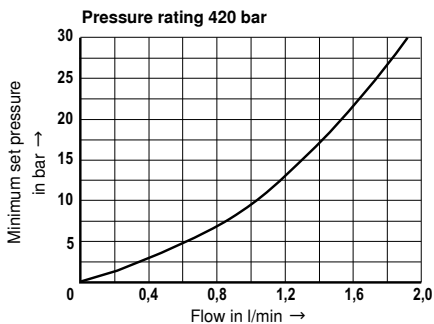
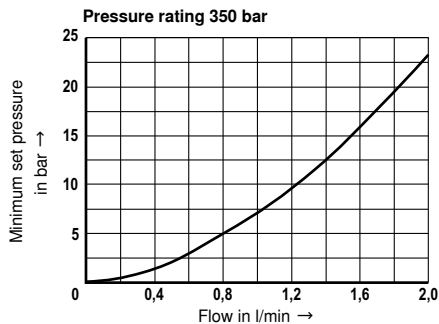
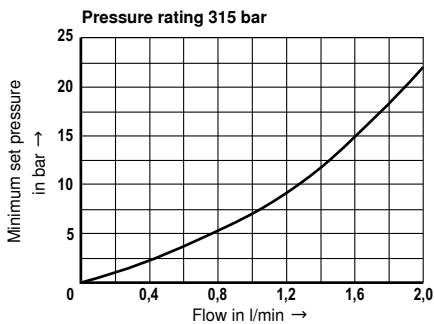
(The characteristic curve was measure without counter pressure in main port ②.)



Characteristic curves (measured with HLP46, $\vartheta_{Oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

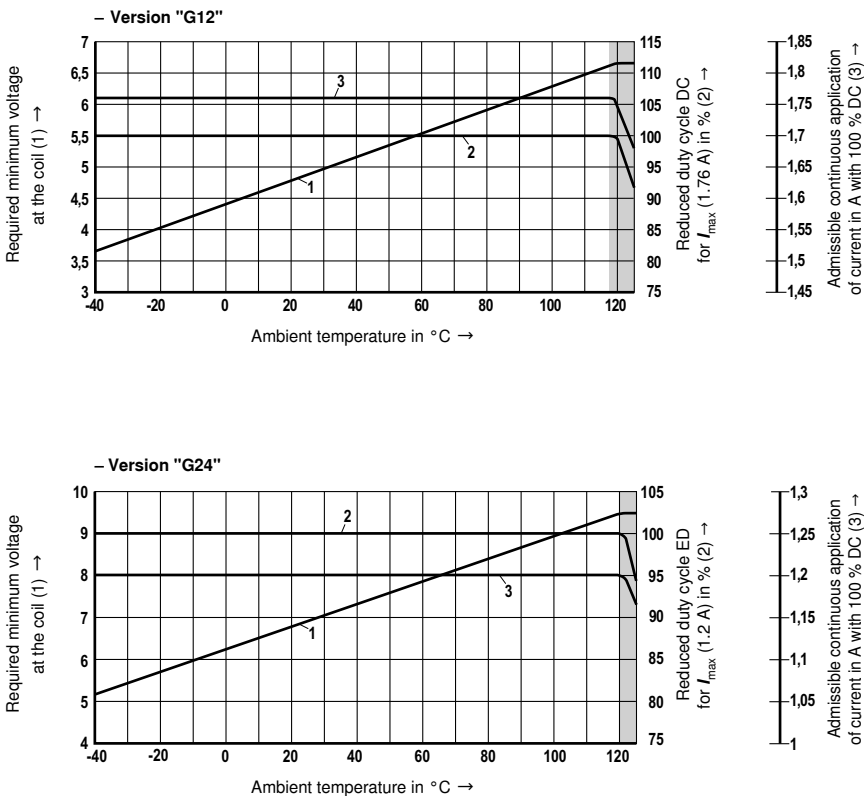
Minimum set pressure in main port ① with command value 100 %.

(The characteristic curve was measured without counter pressure in main port ②.)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

Notice!

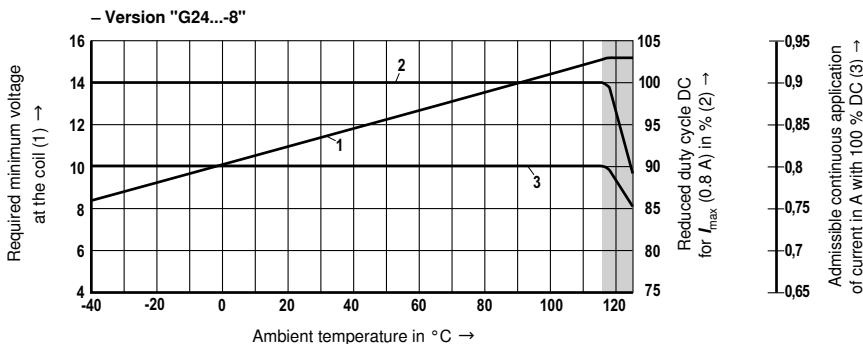
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



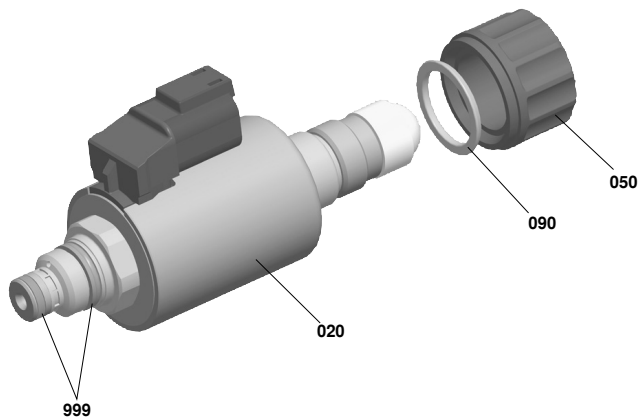
Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection ¹⁾	Version "K4"	12 V	R901002932
			24 V	R901002319
			24 V / 800 mA	R901049962
		Version "K40"	12 V	R901003055
			24 V	R901003053
			24 V / 800 mA	R901050010
		Version "C4"	12 V	R901003044
			24 V	R901003026
			24 V / 800 mA	R901049963
050	Nut		R900992146	
090	Seal ring for pole tube		R900007769	
998	Seal kit of the valve		R961000376	

¹⁾ **Notice!**
After exchange of the solenoid coil, the pressure set in the factory may change by ±5 %.

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Proportional pressure relief valve, pilot operated, increasing characteristic curve

RE 18160

Edition: 2012-05

Type KBVS.1A



H7893

- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 80 l/min

Features

- ▶ Cartridge valve
- ▶ Mounting cavity R/UNF10-01-0-06
- ▶ Pilot operated proportional valve for system pressure limitation
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ Via an adjustment screw, the valve is set to maximum pressure
- ▶ In case of power failure, the minimum pressure is set
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

Contents

Features	1	5
Ordering code	2	
Valve types	3	
Function, symbol	4	
Technical data	5 ... 7	
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Minimum terminal voltage at the coil and relative duty cycle	9, 10	
Unit dimensions	11	
Mounting cavity	12	
Available individual components	13	
More information	13	

Ordering code

01	02	03	04	05	06	07	08	09	10	11	12
KBVS		1	A	A	/	F	C			V	*

01	Proportional pressure relief valve, pilot operated	KBVS
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Pressure rating

02	Up to 50 bar	C
	Up to 100 bar	F
	Up to 150 bar	H
	Up to 210 bar	L
	Up to 250 bar	N
	Up to 315 bar	P
	Up to 350 bar	R
	Up to 420 bar	T

03	Component size 1	1
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04	With a command value = 0, the minimum pressure is set	A
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05	Component series	A
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06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	F
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07	Proportional solenoid, wet-pin	C
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Supply voltage

08	Control electronics 12 V DC	G12
	Control electronics 24 V DC	G24

Electrical connection

09	Without mating connector, with connector according to DIN EN 175301-803	K4
	Without mating connector, with connector DT 04-2PA (Deutsch connector)	K40
	Without mating connector, with connector AMP Junior-Timer	C4

Seal material

10	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

11	Standard version	no code
	Coil 800 mA (see page 6)	-8

12	Further details in the plain text	*
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1) Mating connectors, separate order, see data sheet 08006.

Valve types

Type	Material no.	Type	Material no.
KBVSC1AA/FCG24K40V	R901290550	KBVSN1AA/FCG24K40V	R901290569
KBVSF1AA/FCG24K40V	R901290561	KBVSP1AA/FCG24K40V	R901290570
KBVSH1AA/FCG24K40V	R901290562	KBVSR1AA/FCG24K40V	R901290580
KBVSL1AA/FCG24K40V	R901290567	KBVST1AA/FCG24K40V	R901290585

Function, symbol

General

Valves of type KBVS are pilot operated proportional pressure relief valves in spool design and are used to limit the pressure in hydraulic systems. They mainly consist of the screwed-in proportional pilot control valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited depending on the command value. With command value 0 or in case of power failure, the minimum pressure is set.

Function

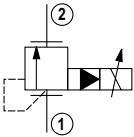
For the proportional increase in the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

($p_{\max}$ = command value max; $p_{\min}$ = command value 0)

Notice!

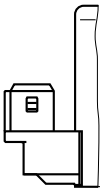
Occurring tank pressures (main port ②) are added up to the set values in main port ①.

Symbol

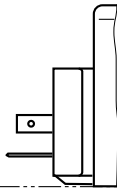


- ① = Main port 1
- ② = Main port 2

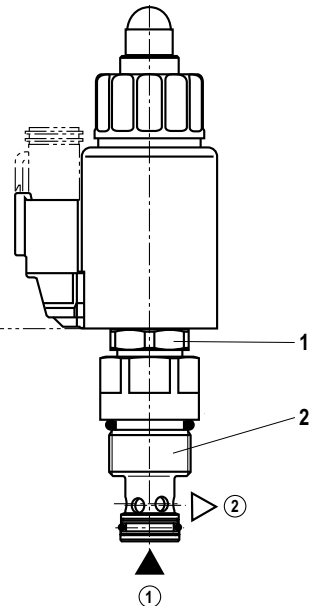
Version "C4"



Version "K4"



Version "K40"
(with mating connector)



Type KBVS.1A..

Technical data (For applications outside these parameters, please consult us!)

general		
Weight	kg	0.75
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	−40 to +120 (see page 8 and 9)
Storage temperature	°C	−20 to +80

Environmental audits

Vibration test according to DIN EN 60068-2 / IEC 60068-2 /2 axes (X/Y)		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.6 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broad-band noise	20 to 2000 Hz, amplitude 0.1 g ² /Hz (14 g RMS/30 g peak), testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms; 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)

Indication per axis

Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)		
DIN EN 60068-2-1: 03/95	Storage temperature	−40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles −25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h

Salt spray test according to DIN 50021	h	720
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→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

Technical data (For applications outside these parameters, please consult us!)

hydraulic		
Maximum operating pressure ¹⁾ – Main port ①	bar	420
Maximum admissible return flow pressure – Main port ②	bar	210
Maximum set pressure ²⁾	See command value pressure characteristic curves page 7	
Maximum set pressure with command value 0	See characteristic curves page 7	
Maximum flow	l/min	80
Pilot oil	l/min	< 0.8
Leakage	ml/min	< 200 (with $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\theta_{oil} = 40$ °C)
Hydraulic fluid	See table below	
Hydraulic fluid temperature range	°C	–40 to +80
Viscosity range	mm ² /s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 ³⁾	
Load cycles	10 million	
Hysteresis ⁴⁾	< 4 % of the max. set pressure	
Turnover voltage ⁴⁾	< 0.5 % of the max. set pressure	
Response sensitivity ⁴⁾	< 0.5 % of the max. set pressure	
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %	< 5 % of the max. set pressure
	– Command value 0	< 2 % of the max. set pressure
Step response ($T_u + T_g$) 0 → 100 % and/or 100 % → 0	ms	100 (depending on the system)

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.

¹⁾ The maximum operating pressure is added up from the set pressure and the return flow pressure!

²⁾ The valves are factory-set. In case of subsequent adjustment, the warranty will become invalid!

³⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

⁴⁾ Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

Technical data (For applications outside these parameters, please consult us!)

electric				
Voltage type		Direct voltage		
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC
Maximum solenoid current	mA	1760	1200	800
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8
	– Max. hot value	Ω	3.8	7.9
				18.9
Duty cycle	%	See characteristic curve page 8 and 9 ⁵⁾		
Maximum coil temperature ⁶⁾	°C	150		
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"	IP 65 with mating connector mounted and locked		
	– Version "C4"	IP 66 with mating connector mounted and locked		
		IP 69K with Rexroth mating connector (material no. R901022127)		
	– Version "K40"	IP 69K with mating connector mounted and locked		
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116	
		Analog amplifier type RA...	Data sheet 95230	
		BODAS control unit type RC...	Data sheet 95200	
Recommended dither frequency (PMW)	Hz	300		
Design according to VDE 0580				

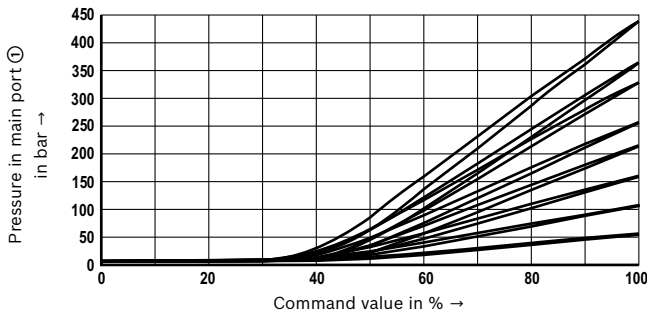
⁵⁾ In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

When establishing the electrical connection, the protective earthing conductor (PE $\pm$) has to be connected properly.

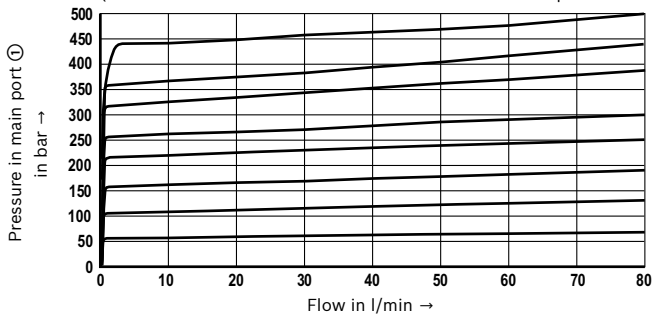
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

Pressure in main port ① depending on the command value; flow = 10 l/min



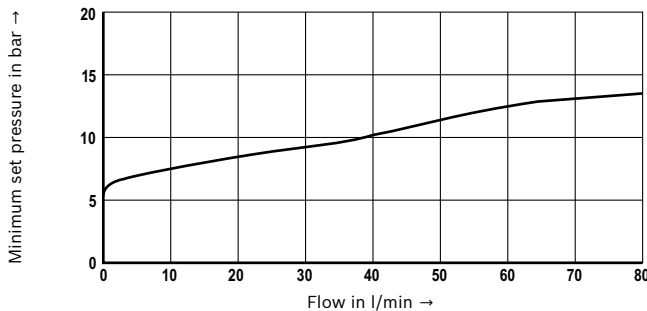
Pressure in main port ① depending on the flow.

(The characteristic curves were measured without back pressure in main port ②)



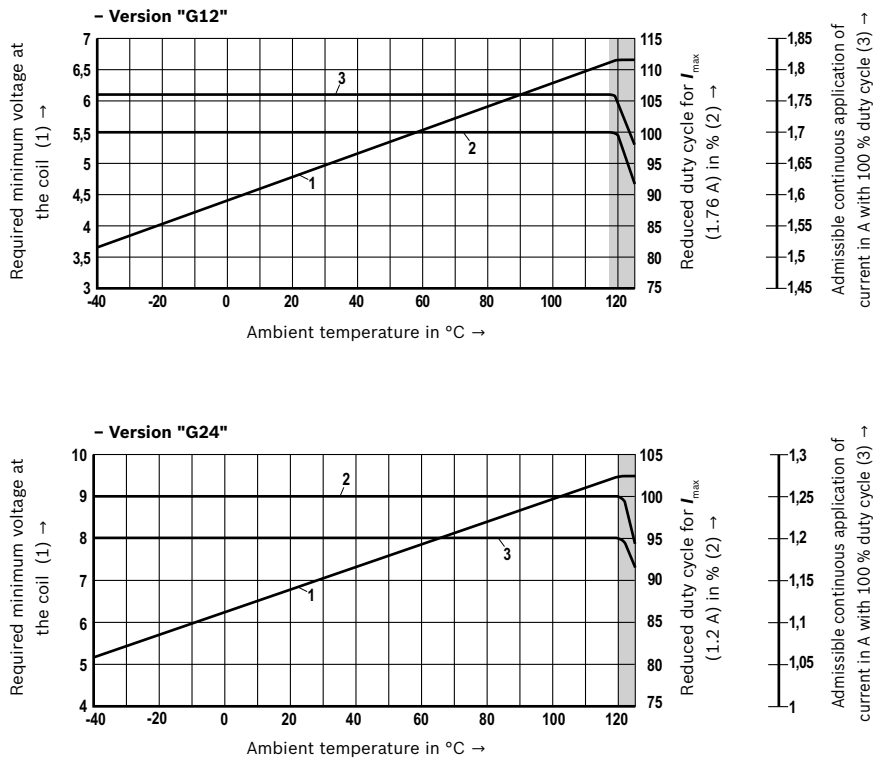
Minimum set pressure in the main port ① depending on the flow.

(The characteristic curves were measured without back pressure in main port ②)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



Limited valve performance

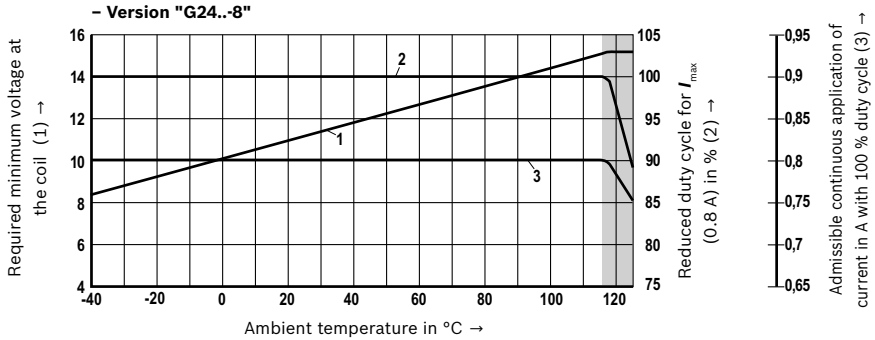


Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.
 Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.
 In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



Limited valve performance



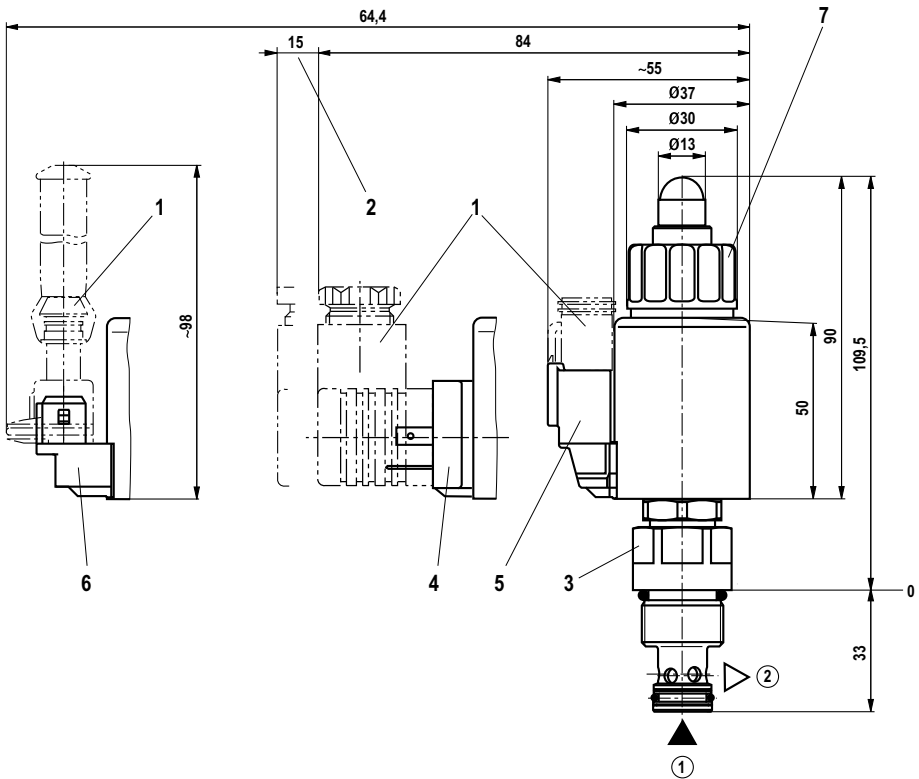
Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

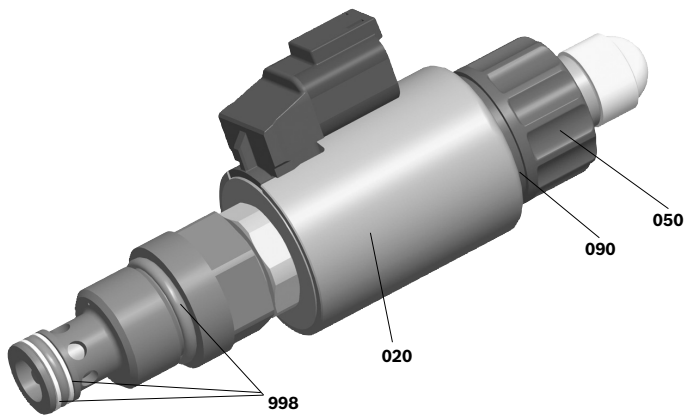
Unit dimensions (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque $M_A = 55^{+5}$ Nm
- 4 Version "K4"
- 5 Version "K40"
- 6 Version "C4"
- 7 Nut, tightening torque $M_A = 5^{+1}$ Nm

- ① = Main port 1
- ② = Main port 2

Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection ¹⁾	K4	12 V	R901002932
			24 V / 1200 mA	R901002319
			24 V / 800 mA	R901049962
		K40	12 V	R901003055
			24 V / 1200 mA	R901003053
			24 V / 800 mA	R901050010
		C4	12 V	R901003044
			24 V / 1200 mA	R901003026
			24 V / 800 mA	R901049963
050	Nut			R900992146
090	Seal ring for pole tube			R900007769
998	Seal kit of the valve			R901006735

¹⁾ After exchange of the solenoid coil, the pressure set in the factory may change by $\pm 5\%$.

More information

- ▶ Control electronics:
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
 - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116
Data sheet 95230
Data sheet 95200
www.boschrexroth.com/filter

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Proportional pressure relief valve, pilot operated, decreasing characteristic curve

RE 18152

Edition: 2012-07

Replaces: 05.12

Type KBVS.1B



H7893

- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 80 l/min

Features

- ▶ Cartridge valve
- ▶ Mounting cavity R/UNF10-01-0-06
- ▶ Pilot operated proportional valve for system pressure limitation
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ Via an adjustment screw, the valve is set to maximum pressure
- ▶ In case of power failure, the maximum pressure set results
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

Contents

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Mounting cavity	12	
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Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09	10	11	12
KBVS		1	B	A	/	F	C			V	*

01	Proportional pressure relief valve, pilot operated	KBVS
Pressure rating		
02	Up to 50 bar	C
	Up to 100 bar	F
	Up to 150 bar	H
	Up to 210 bar	L
	Up to 250 bar	N
	Up to 315 bar	P
	Up to 350 bar	R
	Up to 420 bar	T
03	Component size 1	1
04	With a command value = 0, the maximum pressure is set	B
05	Component series	A
06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	F
Seal material		
10	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	
12	Further details in the plain text	*

Valve types (without coil) ¹⁾

Type	Material no.	Type	Material no.
KBVSC1BA/FV	R901325098	KBVSN1BA/FV	R901325107
KBVSF1BA/FV	R901325099	KBVSP1BA/FV	R901325109
KBVSH1BA/FV	R901325102	KBVSR1BA/FV	R901325111
KBVSL1BA/FV	R901325105	KBVST1BA/FV	R901325112

Available coils (separate order) ¹⁾

	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
Direct voltage DC ³⁾			
12 V	R901002932	R901003055	R901003044
24 V / 1200 mA	R901002319	R901003053	R901003026
24 V / 800 mA	R901049962	R901050010	R901049963

¹⁾ Complete valves with mounted coil upon request

²⁾ Mating connectors, separate order, see data sheet 08006.

³⁾ Other voltages upon request.

Function, symbol

General

Valves of type KBVS are pilot operated proportional pressure relief valves in spool design and are used to limit the pressure in hydraulic systems. They mainly consist of the screwed-in proportional pilot control valve (1) and the main valve (2).

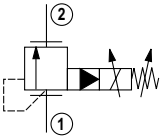
These valves can be used for infinitely adjusting the pressure to be limited depending on the command value. With command value 0 or in case of power failure, the maximum pressure is set (fail-safe characteristics).

Function

In the factory, the valves are mechanically set to the maximum pressure. For the proportional reduction of the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

($p_{\max}$ = command value 0; $p_{\min}$ = command value max)

Symbol

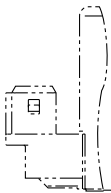


- ① = Main port 1
- ② = Main port 2

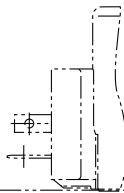
Notice!

Occurring tank pressures (main port ②) are added up to the set values in main port ①.

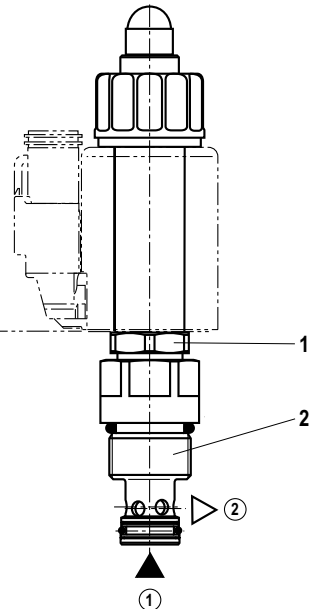
Version "C4"



Version "K4"



Version "K40"
(with mating connector)



Type KBVS.1B..

Technical data (For applications outside these parameters, please consult us!)

general		
Weight	kg	0.75
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	−40 to +120 (see page 8 and 9)
Storage temperature	°C	−20 to +80

Environmental audits

Vibration test according to DIN EN 60068-2 / IEC 60068-2 /2 axes (X/Y)		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.6 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broad-band noise	20 to 2000 Hz, amplitude 0.1 g ² /Hz (14 g RMS/30 g peak), testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms; 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)
Indication per axis		
Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)		
DIN EN 60068-2-1: 03/95	Storage temperature	−40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles −25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h
Salt spray test according to DIN 50021		h 720

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

Technical data (For applications outside these parameters, please consult us!)

hydraulic			
Maximum operating pressure ¹⁾	– Main port ①	bar	420
Maximum admissible return flow pressure	– Main port ②	bar	210
Maximum set pressure ²⁾			See command value pressure characteristic curves page 7
Maximum set pressure with command value 0			See characteristic curves page 7
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 200 (with $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm ² /s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ³⁾
Load cycles			10 million
Hysteresis ⁴⁾			< 4 % of the max. set pressure
Turnover voltage ⁴⁾			< 0.5 % of the max. set pressure
Response sensitivity ⁴⁾			< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %		< 2 % of the max. set pressure
	– Command value 0		< 5 % of the max. set pressure
Step response ($T_u + T_g$)		ms	100 (depending on the system)
0 → 100 % and/or 100 % → 0			

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.

- ¹⁾ The maximum operating pressure is added up from the set pressure and the return flow pressure!
- ²⁾ The valves are factory-set. In case of subsequent adjustment, the warranty will become invalid!
- ³⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

- ⁴⁾ Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

Technical data (For applications outside these parameters, please consult us!)

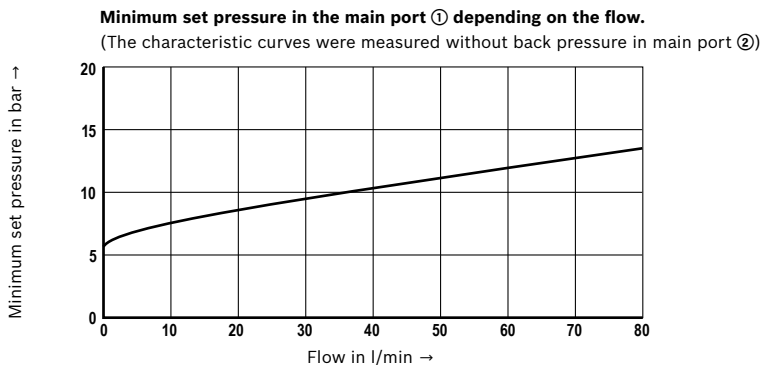
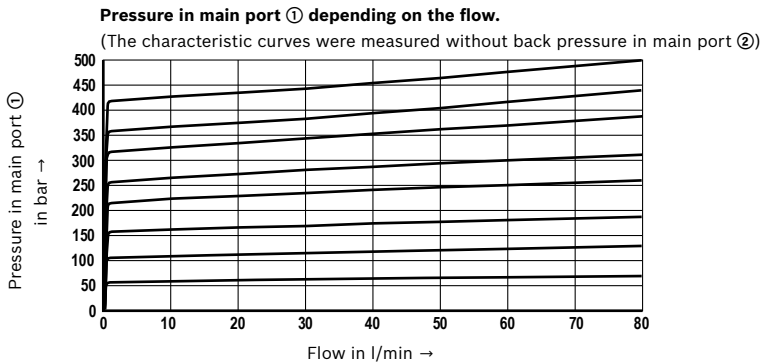
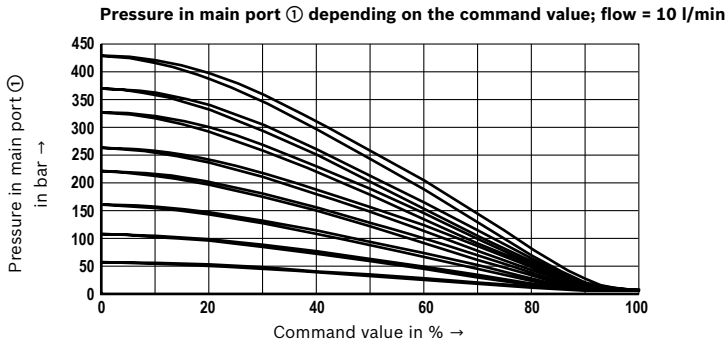
electric				
Voltage type		Direct voltage		
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC
Maximum solenoid current	mA	1760	1200	800
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8
	– Max. hot value	Ω	3.8	7.9
				11.5
				18.9
Duty cycle	%	See characteristic curve page 8 and 9 ⁵⁾		
Maximum coil temperature ⁶⁾	°C	150		
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"	IP 65 with mating connector mounted and locked		
	– Version "C4"	IP 66 with mating connector mounted and locked		
		IP 69K with Rexroth mating connector (material no. R901022127)		
	– Version "K40"	IP 69K with mating connector mounted and locked		
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116	
		Analog amplifier type RA...	Data sheet 95230	
		BODAS control unit type RC...	Data sheet 95200	
Recommended dither frequency (PMW)	Hz	300		
Design according to VDE 0580				

⁵⁾ In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

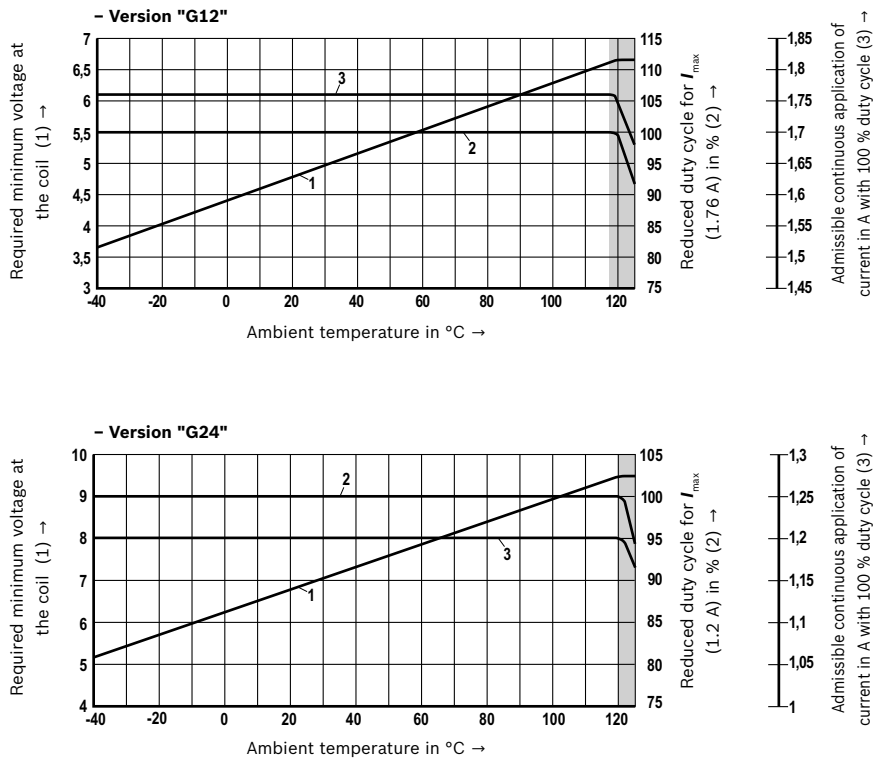
When establishing the electrical connection, the protective earthing conductor (PE $\pm$) has to be connected properly.

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



Limited valve performance

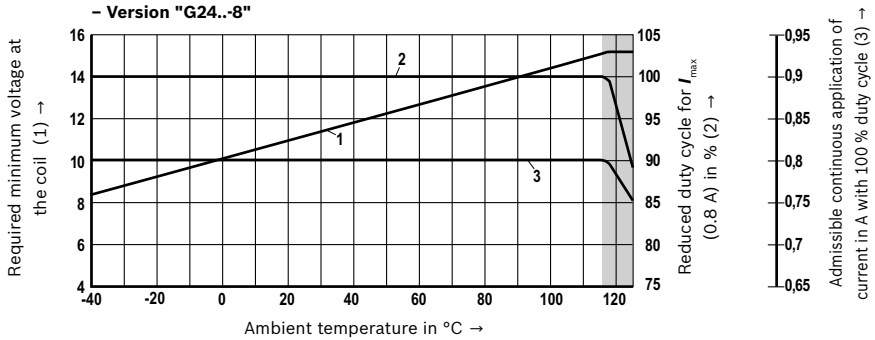


Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.
 Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.
 In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range depending on the ambient temperature



Limited valve performance



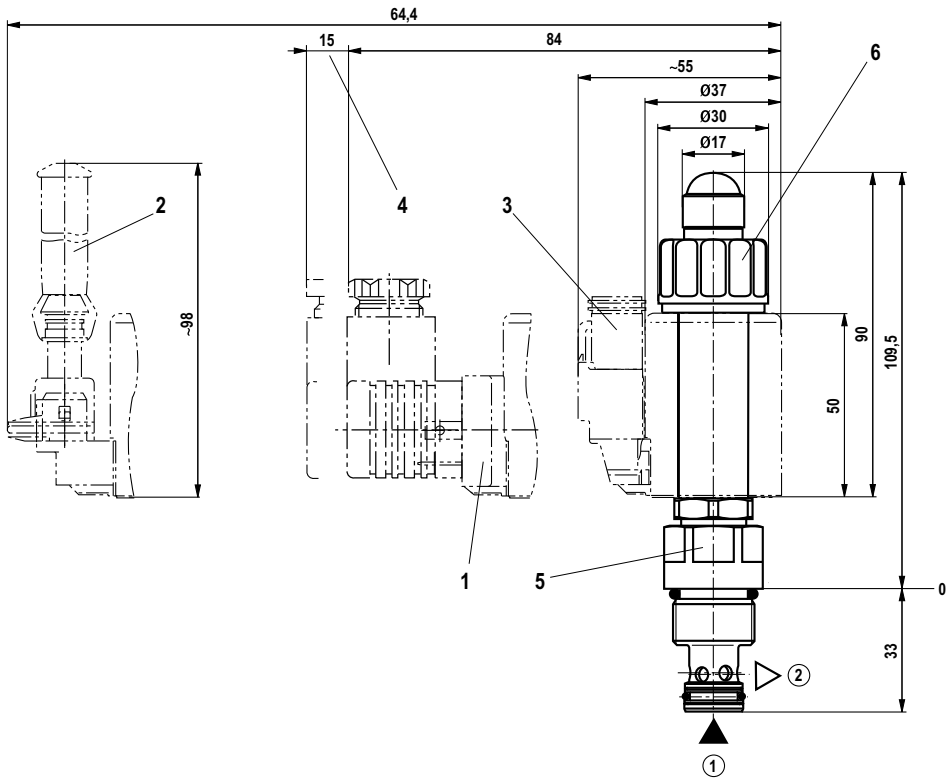
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Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions (dimensions in mm)



1 Mating connectors, separate order, see data sheet 08006

2 Space required to remove the mating connector

3 SW24, tightening torque $M_A = 55^{+5}$ Nm

4 Version "K4"

5 Version "K40"

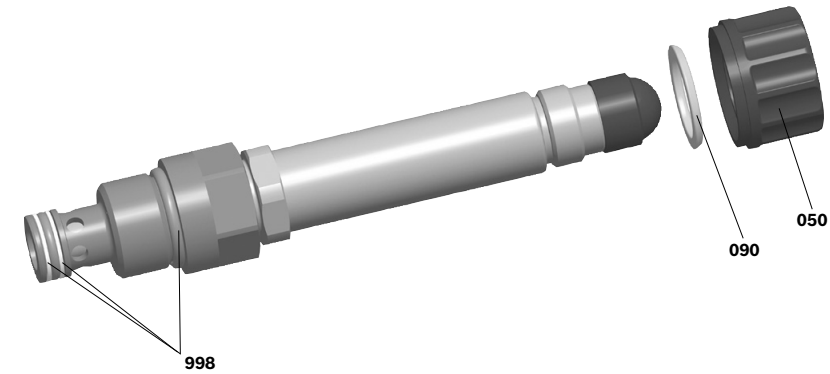
6 Version "C4"

7 Nut, tightening torque $M_A = 5^{+1}$ Nm

① = Main port 1

② = Main port 2

Available individual components



Item	Denomination	Material no.
050	Nut	R900992146
090	Seal ring for pole tube	R900007769
998	Seal kit of the valve	R901006735

Coils, separate order, see page 2

More information

- ▶ Control electronics:
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
 - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116
Data sheet 95230
Data sheet 95200
www.boschrexroth.com/filter

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Proportional pressure relief valve, pilot-operated, rising characteristic curve

RE 18139-08/07.12 1/12
Replaces: 09.07

Type KBVS.3A (High-Performance)

Component size 3
Component series A
Maximum operating pressure 350 bar
Maximum flow 200 l/min



H7139

Overview of contents

Contents

Features
Ordering code
Preferred types
Function, symbol
Technical data
Characteristic curves
Minimum terminal voltage at the coil and relative duty cycle
Unit dimensions
Mounting cavity
Available individual components

Features

Page	
1	– Mounting cavity R/ISO 7789-33-01-0-98
2	– Pilot-operated valve for limiting a system pressure
2	– Suitable for mobile and industrial applications
3	– Operation by proportional solenoid
4, 5	– Proportional solenoid with central thread and detachable coil
6	– Cartridge valve
7,8	– Control electronics: plug-in amplifier VT-SSPA1...
9	– Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics
10	– In the event of a power failure, the minimum pressure becomes effective
11	

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

Pilot-operated proportional pressure relief valve

Pressure stage

up to 50 bar = C

up to 100 bar = F

up to 150 bar = H

up to 210 bar = L

up to 250 bar = N

up to 315 bar = P

up to 350 bar = R

Component size 3 = 3

At command value = 0 the pressure is set = A

Component series = A

KBVS

3

A

A / L

C

V

*

Further details in clear text

no code = Standard

-8 = Coil 800 mA (see page 5)

Seal material

V = FKM seals

⚠ Caution!

Observe compatibility of seals with the hydraulic fluid used!

Electrical connection ¹⁾

K4 = Component plug 03-pin (2+PE) K4, DIN EN 175301-803

K40 = Component plug 02-pin K40 DT 04-2PA, make: Deutsch

C4 = Cable plug 02-pin C4/Z30 type: Junior-Timer

Supply voltage

G12 = Control electronics 12 V DC

G24 = Control electronics 24 V DC

C = Proportional solenoid, wet pin

L = High-Performance and mounting cavity R/ISO 7789 ²⁾

Preferred types

Type	Material number
KBVSC3AA/LCG24K4V	R901061858
KBVSF3AA/LCG24K4V	R901061859
KBVSH3AA/LCG24K4V	R901061869
KBVSL3AA/LCG24K4V	R901061873
KBVSN3AA/LCG24K4V	R901061874
KBVSP3AA/LCG24K4V	R901061875
KBVSR3AA/LCG24K4V	R901061877

1096

Function, Symbol

General

Valves of the KBVS type are pilot-operated proportional pressure relief valves of poppet design and used for limiting the pressure in hydraulic systems. They basically consist of a screwed-in proportional pilot valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited in dependence upon the command value. At command value 0 or in the event of a power failure, the minimum pressure is set.

Basic principle

For the proportional increase in the system pressure, a command value is selected on the control electronics. The electronics controls the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port 1 via pilot valve (1) and main valve (2).

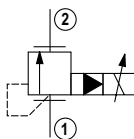
($p_{\max}$ = command value max; $p_{\min}$ = command value 0)

Internal pilot oil supply and drain.

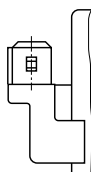
Note!

Any tank pressures (main port 2) add to the set value in main port 1.

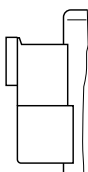
Symbol



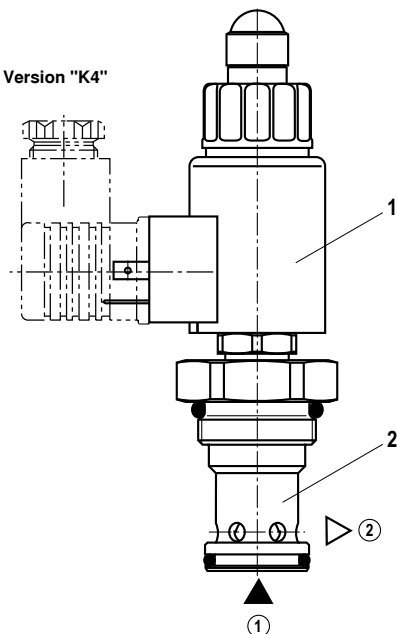
Version "C4"



Version "K40"



Version "K4"



Technical data (for applications outside these parameters, please consult us!)**general**

Weight	kg	0,7
Installation orientation		Optional, if it can be ensured that no air can collect upstream of the valve. Otherwise, we recommend that the valve be mounted in a suspended position.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

Environmental tests:**Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)**

DIN EN 60068-2-6: 05/96	Vibration, sinusoidal	10 cycles at 5 to 2000 to 5 Hz with a logarithmic frequency change rate of 1 Oct./min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibration (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g ² /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shock test	Half sine 15 g / 11 ms; 3 x in pos., 3 x in neg. direction (6 individual shocks in total)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms; 1000 x in pos., 1000 x in neg. direction (2000 individual shocks in total)

Details per axis**Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental testing):**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, dwell time 16 h
DIN EN 60068-2-2: 08/94		+110 °C, dwell time 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles at -25 °C, dwell time 2 h
DIN EN 60068-2-2: 08/94	Dry heat test	2 cycles at +120 °C, dwell time 2 h
IEC 60068-2-30: 1985	Damp heat, cyclical	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles, 24 h each

Salt spray test: 720 h according to DIN 50021

→ Finish painting generally not required. Should you nevertheless wish to apply a finish coat, observe the reduced heat dissipation capacity.

hydraulic

Max. operating pressure ¹⁾ (main port 1)	bar	350
Max. permissible return flow pressure (main port 2)	bar	210
Maximum set pressure ²⁾		See command value/pressure characteristic curves on page 6
Minimum set pressure at command value 0		See characteristic curves on page 6
Maximum flow	l/min	200 (with pressure stage 350 bar max. 100 l/min)
Hydraulic fluid		see page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm ² /s	15 to 380
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class acc. to ISO 4406 (c)		Class 20/18/15 ³⁾

¹⁾ **⚠ Caution!** The maximum operating pressure is added up from the set pressure and the return flow pressure!

²⁾ **⚠ Caution!** The valves are factory-set. In the case of subsequent re-adjustment, the warranty will become void!

³⁾ The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see www.boschrexroth.com/filter

Technical data (for applications outside these parameters, please consult us!)**hydraulic**

Hysteresis		< 6 % of max. set pressure
Range of inversion		< 0,5 % of max. set pressure
Response sensitivity		< 0,5 % of max. set pressure
Tolerance of the command value/pressure characteristic curve	– Command value 100 %	< 5 % of max. set pressure
	– Command value 0	< 2 % of max. set pressure
Step response ($T_u + T_g$) 0 → 100 % or 100 % → 0	ms	100 (depends on system)

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	FKM	VDMA 24568
	– Soluble in water	HEPG	FKM	
 Important information on hydraulic fluids! ► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! ► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solvent, zinc may accumulate in the fluid.				

electrical

Supply voltage	V	12 DC	24 DC	“-8” / 24 DC
Maximum control current	mA	max. nominal current 1760 mA	max. nominal current 1200 mA	max. nominal current 800 mA
Coil resistance	– Cold value at 20 °C	Ω	2,3	4,8
	– Max. hot value	Ω	3,8	7,9
Duty cycle	%	100 ⁴⁾		
Maximum coil temperature ⁵⁾	°C	150		
Type of protection acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version “K4”	IP 65 with cable socket mounted and locked		
	– Version “C4”	IP 66 with cable socket mounted and locked		
		IP 69K with Rexroth cable socket (material no. R901022127)		
	– Version “K40”	IP 69K with cable socket mounted and locked		
Control electronics ⁶⁾		Plug-in amplifier VT-SSPA1 (300 Hz)		
Rating according to VDE 0580				

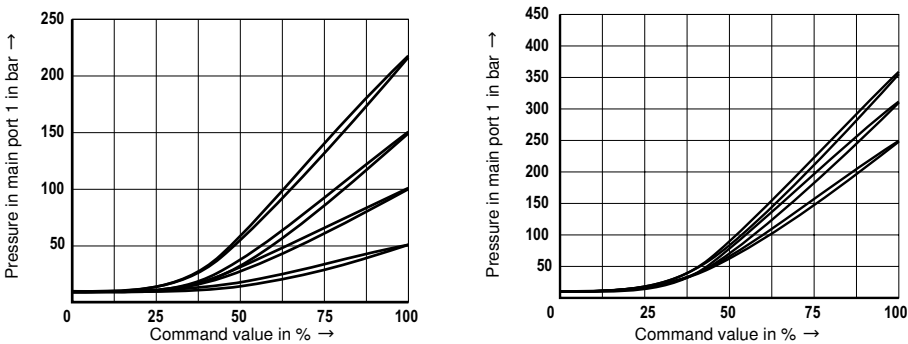
⁴⁾ In the case of use at heights > 2000 m above MSL we recommend that you consult the manufacturer.

⁵⁾ Due to the surface temperatures occurring on solenoid coils, the European standards ISO 13732-1 and EN 982 must be observed!

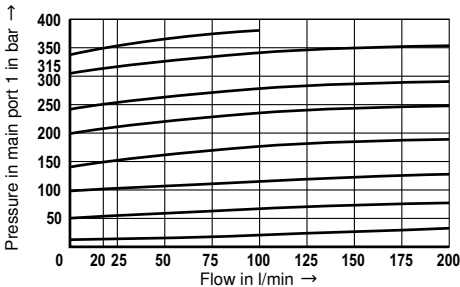
⁶⁾ Separate order, see RE 30116

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 24 V coil)

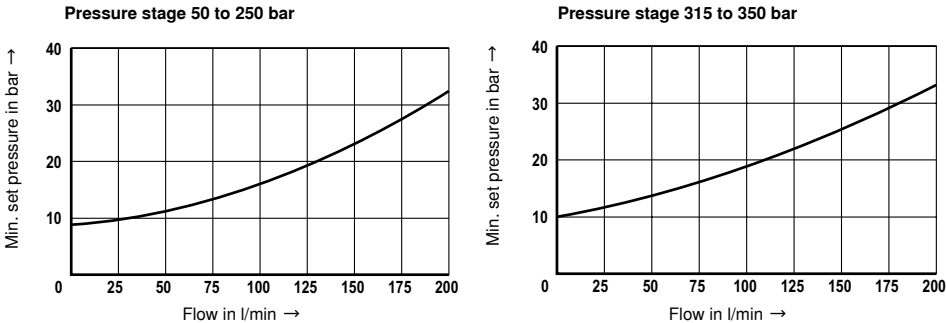
Pressure in main port 1 in dependence on command value. Flow = 20 l/min



Pressure in main port 1 in dependence on flow.
 (The characteristic curves were measured without backpressure in main port 2.)

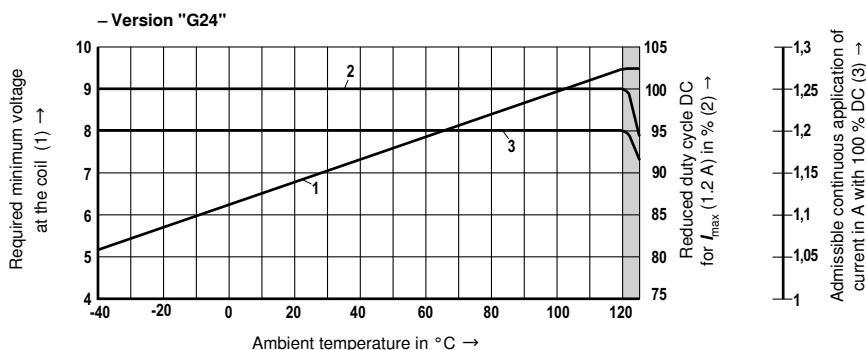
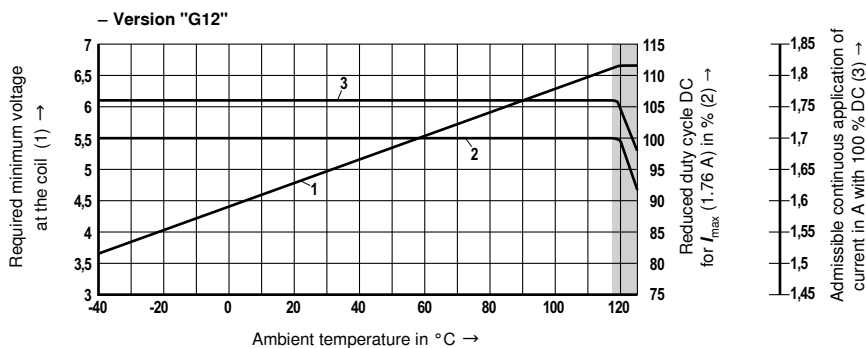


Minimum set pressure in main port 1 at command value 0.
 (The characteristic curves were measured without backpressure in main port 2.)



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

Notice!

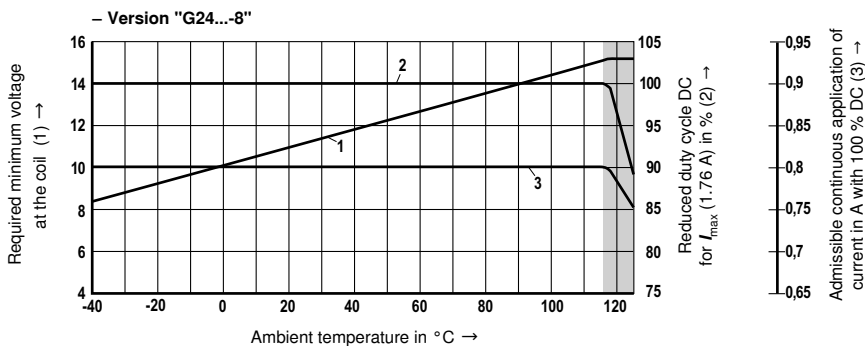
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

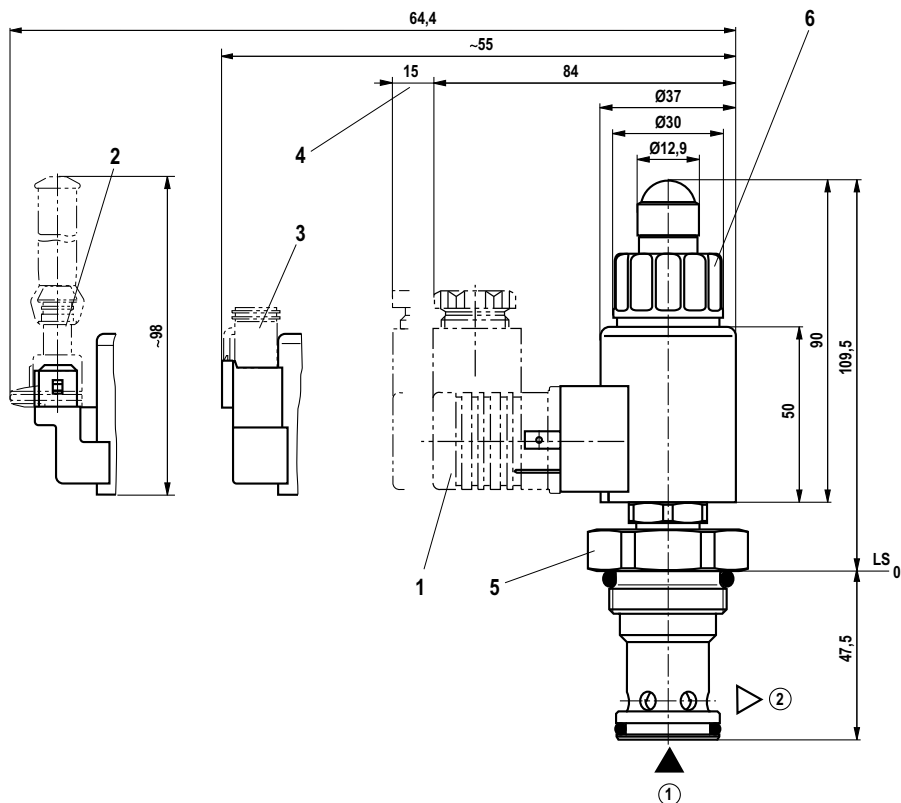


Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions (dimensions in mm)

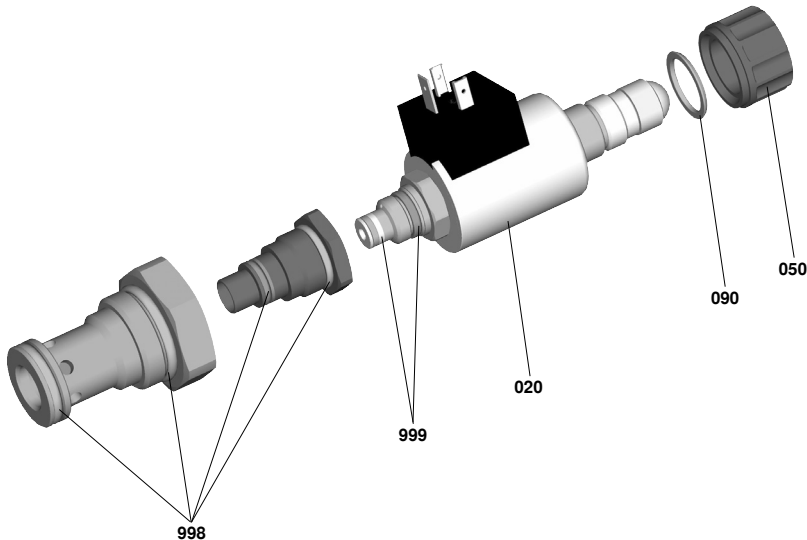
① = Main port 1

② = Main port 2

LS = Location shoulder

- 1 Cable socket for component plug "K4"
(separate order, see RE 08006)
- 2 Cable socket for component plug "C4"
(separate order, see RE 08006)
- 3 Cable socket for component plug "K40"
(separate order, see RE 08006)
- 4 Space required to remove the plug-in connector
- 5 Hexagon SW41;
 - Tightening torque $M_A = 100^{+20}$ Nm (< 250 bar)
 - Tightening torque $M_A = 120^{+20}$ Nm (> 250 bar)
- 6 Solenoid nut, tightening torque $M_A = 5^{+1}$ Nm

Available individual components



Item	Designation	DC	Material no.
020	Coil for individual connection ¹⁾ Version K4	12 V	R901002932
		24 V	R901002319
		24 V / 800 mA	R901049962
	Version K40	12 V	R901003055
		24 V	R901003053
		24 V / 800 mA	R901050010
	Version C4	12 V	R901003044
		24 V	R901003026
		24 V / 800 mA	R901049963
050	Nut		R900992146
090	Seal ring for pressure tube		R900007769
998	Main stage seal kit		R961001025
999	Pilot valve seal kit		R961000376

¹⁾  **Note!**
After the solenoid coil was replaced, the factory-set pressure may change by ±5 %.

Notes

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Proportional pressure relief valve, pilot-operated, falling characteristic curve

RE 18139-07/07.12 1/12
Replaces: 06.08

Type KBVS.3B (High-Performance)

Component size 3
Component series A
Maximum operating pressure 350 bar
Maximum flow 200 l/min



H7139

Overview of contents

Contents	Page
Features	1
Ordering code	2
Preferred types	2
Function, symbol	3
Technical data	4, 5
Characteristic curves	6
Minimum terminal voltage at the coil and relative duty cycle	7, 8
Unit dimensions	9
Mounting cavity	10
Available individual components	11

Features

- Mounting cavity R/ISO 7789-33-01-0-98
- Pilot-operated valve for limiting a system pressure
- Suitable for mobile and industrial applications
- Operation by proportional solenoid
- Proportional solenoid with central thread and detachable coil
- Cartridge valve
- Control electronics: plug-in amplifier VT-SSPA1..
- Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics
- Valves are adjusted to max. pressure by means of an adjustment screw
- In the event of a power failure, the maximum set pressure becomes effective

Ordering code

KBVS		3	B	A / L	C			V		*
Pilot-operated proportional pressure relief valve										Further details in clear text
Pressure stage										no code = Standard
up to 50 bar		= C								-8 = Coil 800 mA
up to 100 bar		= F								(see page 5)
up to 150 bar		= H								Seal material
up to 210 bar		= L								V = FKM seals
up to 250 bar		= N								⚠ Caution!
up to 315 bar		= P								Observe compatibility of seals with the hydraulic fluid used!
up to 350 bar		= R								Electrical connection ¹⁾
Component size 3		= 3								K4 = Component plug 03-pin (2+PE) K4, DIN EN 175301-803
At command value = 0 the maximum pressure is set		= B								K40 = Component plug 02-pin K40 DT 04-2PA, make: Deutsch
Component series		= A								C4 = Cable plug 02-pin C4/Z30 type: Junior-Timer
										Supply voltage
										G12 = Control electronics 12 V DC
										G24 = Control electronics 24 V DC
										C = Proportional solenoid, wet pin
										L = High-Performance and mounting cavity R/ISO 7789 ²⁾

¹⁾ Cable sockets (separate order), see RE 08006
²⁾ See page 10

Preferred types

Type	Material number
KBVSC3BA/LCG24K4V	R901042645
KBVSF3BA/LCG24K4V	R901042649
KBVSH3BA/LCG24K4V	R901047841
KBVSL3BA/LCG24K4V	R901032852
KBVSN3BA/LCG24K4V	R901041058
KBVSP3BA/LCG24K4V	R901042652
KBVSR3BA/LCG24K4V	R901022444

Function, Symbol

General

Valves of the KBVS type are pilot-operated proportional pressure relief valves of poppet design and used for limiting the pressure in hydraulic systems. They basically consist of a screwed-in proportional pilot valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited in dependence upon the command value. At command value 0 or in the event of a power failure, the maximum pressure is set (fail-safe characteristics).

Basic principle

The mechanics of the valve is factory-set to the maximum pressure. A command value for the proportional reduction of the system pressure is selected on the control electronics.

The electronics controls the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port ① via pilot valve (1) and main valve (2).

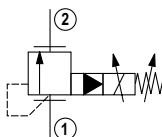
($p_{\max}$ = command value 0; $p_{\min}$ = command value max.)

Internal pilot oil supply and drain.

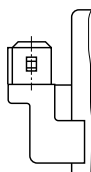
Note!

Any tank pressures (main port ②) add to the set value in main port ①.

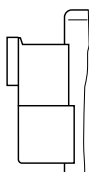
Symbol



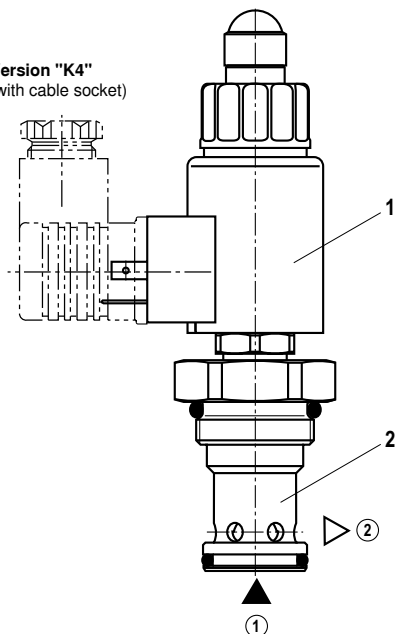
Version "C4"



Version "K40"



Version "K4"
(with cable socket)



Technical data (for applications outside these parameters, please consult us!)**general**

Weight	kg	0,7
Installation orientation		Optional, if it can be ensured that no air can collect upstream of the valve. Otherwise, we recommend that the valve be mounted in a suspended position.
Ambient temperature range	°C	-20 to +120 (-40 to +110 for fan drives)
Storage temperature range	°C	-20 to +80

Environmental tests:**Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)**

DIN EN 60068-2-6: 05/96	Vibration, sinusoidal	10 cycles at 5 to 2000 to 5 Hz with a logarithmic frequency change rate of 1 Oct./min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibration (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g ² /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shock test	Half sine 15 g / 11 ms; 3 x in pos., 3 x in neg. direction (6 individual shocks in total)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms; 1000 x in pos., 1000 x in neg. direction (2000 individual shocks in total)

Details per axis**Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental testing):**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, dwell time 16 h
DIN EN 60068-2-2: 08/94		+110 °C, dwell time 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles at -25 °C, dwell time 2 h
DIN EN 60068-2-2: 08/94	Dry heat test	2 cycles at +120 °C, dwell time 2 h
IEC 60068-2-30: 1985	Damp heat, cyclical	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles, 24 h each

Salt spray test: 720 h according to DIN 50021

→ Finish painting generally not required. Should you nevertheless wish to apply a finish coat, observe the reduced heat dissipation capacity.

hydraulic

Max. operating pressure ¹⁾ (main port ①)	bar	350
Max. permissible return flow pressure (main port ②)	bar	210
Maximum set pressure ²⁾		See command value/pressure characteristic curves on page 6
Minimum set pressure at max. command value		See characteristic curves on page 6
Maximum flow	l/min	200 (with pressure stage 350 bar max. 100 l/min)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80 (-20 to +110 for fan drives)
Viscosity range	mm ² /s	12 to 800
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class acc. to ISO 4406 (c)		Class 20/18/15 ³⁾

¹⁾ **⚠ Caution!** The maximum operating pressure is added up from the set pressure and the return flow pressure!

²⁾ **⚠ Caution!** The valves are factory-set. In the case of subsequent re-adjustment, the warranty will become void!

³⁾ The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see www.boschrexroth.com/filter

Technical data (for applications outside these parameters, please consult us!)**hydraulic**

Hysteresis		< 4 % of max. set pressure
Range of inversion		< 0.5 % of max. set pressure
Response sensitivity		< 0.5 % of max. set pressure
Tolerance of the command value/pressure	– Command value 100 %	< 2 % of max. set pressure
characteristic curve	– Command value 0	< 5 % of max. set pressure
Step response ($T_u + T_g$) 0 → 100 % or 100 % → 0	ms	100 (depends on system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water – Soluble in water	HEES HEPG	FKM FKM
 Important information on hydraulic fluids! ► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! ► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ► Bio-degradable: When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.			

electrical

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC
Maximum control current	mA	max. nominal current 1760 mA	max. nominal current 1200 mA	max. nominal current 800 mA
Coil resistance	– Cold value at 20 °C – Max. hot value	Ω Ω	2,3 3,8	4,8 7,9
Duty cycle	%	100 ⁴⁾		
Maximum coil temperature ⁵⁾	°C	150		
Type of protection acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version "K4" – Version "C4" – Version "K40"	IP 65 with cable socket mounted and locked IP 66 with cable socket mounted and locked IP 69K with Rexroth cable socket (material no. R901022127) IP 69K with cable socket mounted and locked		
Control electronics ⁶⁾		Plug-in amplifier VT-SSPA1		
Rating according to VDE 0580				

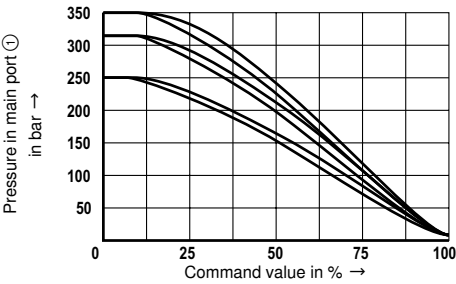
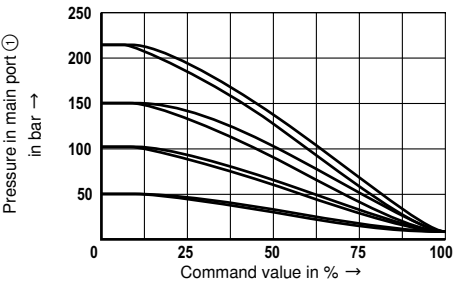
⁴⁾ In the case of use at heights > 2000 m above MSL we recommend that you consult the manufacturer.

⁵⁾ Due to the surface temperatures occurring on solenoid coils, the European standards ISO 13732-1 and EN 982 must be observed!

⁶⁾ Separate order, see RE 30116

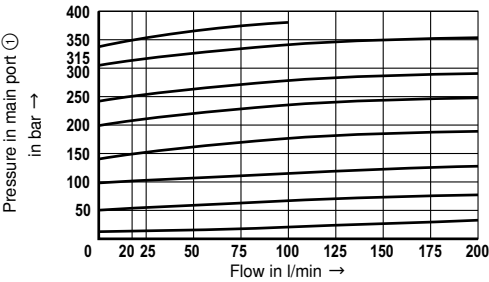
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

Pressure in main port ① in dependence on command value. Flow = 20 l/min



Pressure in main port ① in dependence on flow.

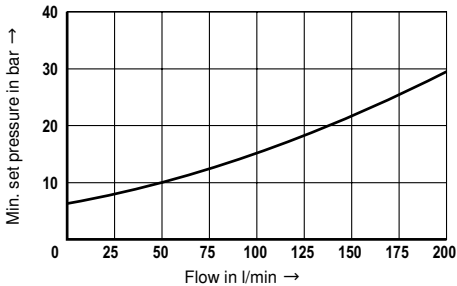
(The characteristic curves were measured without backpressure in main port ②.)



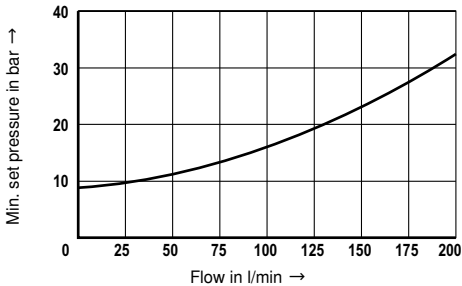
Minimum set pressure in main port ① at command value 100 %.

(The characteristic curves were measured without backpressure in main port ②.)

Pressure stage 50 to 250 bar

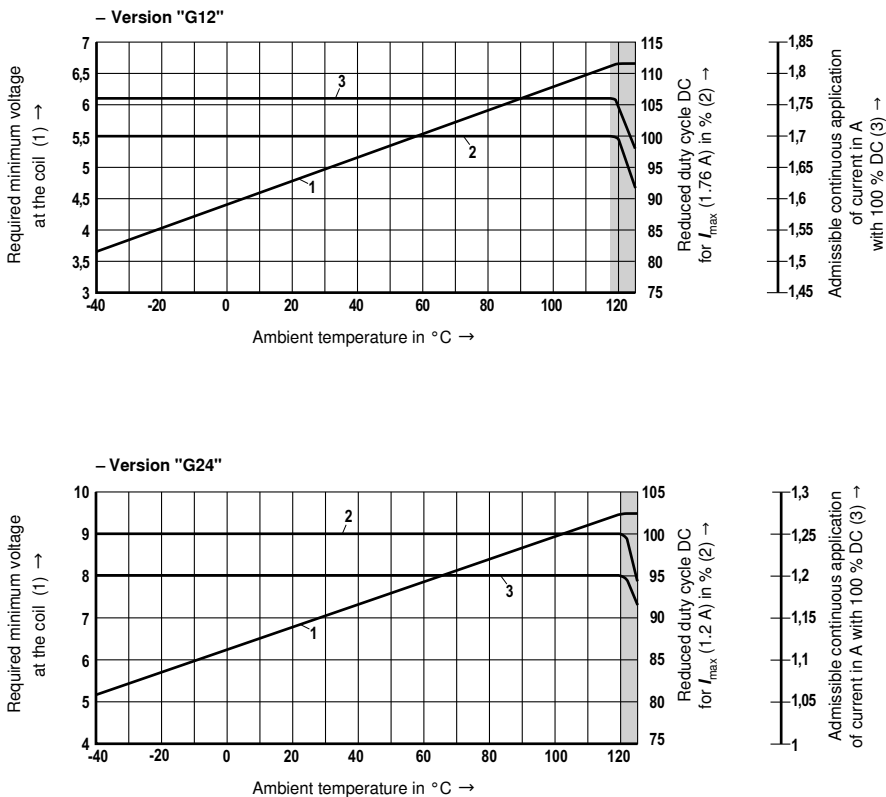


Pressure stage 315 and 350 bar



Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance

Notice!

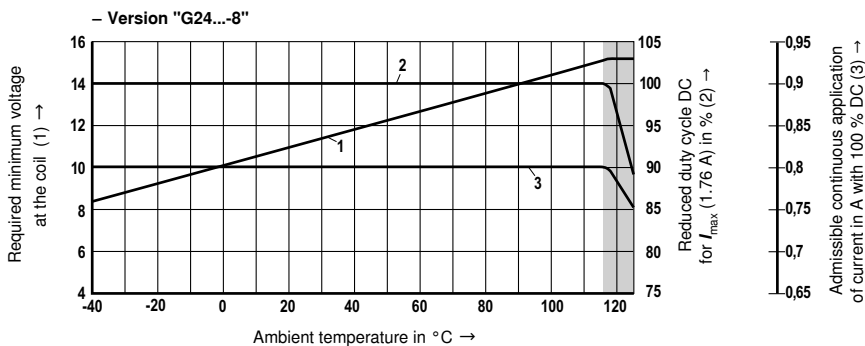
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

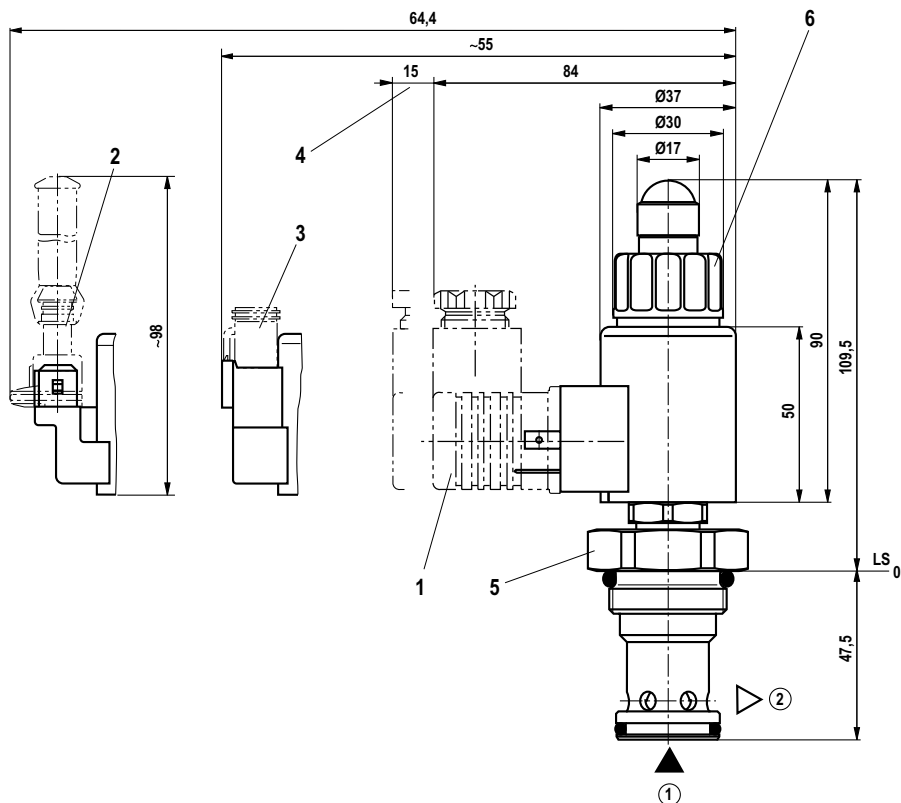


Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions (dimensions in mm)

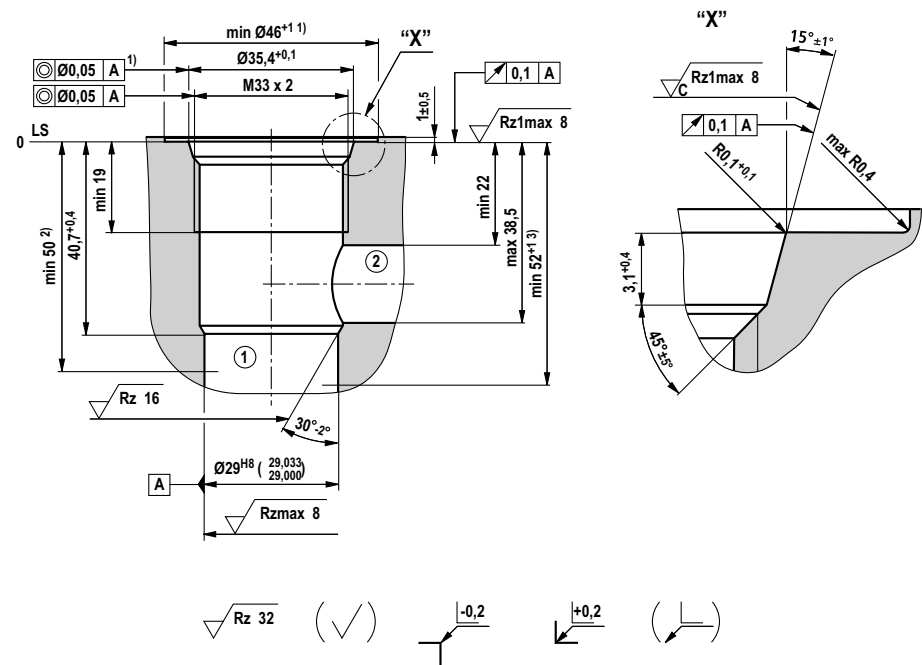
① = Main port 1

② = Main port 2

LS = Location shoulder

- 1 Cable socket for component plug "K4" (separate order, see RE 08006)
- 2 Cable socket for component plug "C4" (separate order, see RE 08006)
- 3 Cable socket for component plug "K40" (separate order, see RE 08006)
- 4 Space required to remove the plug-in connector
- 5 Hexagon SW41;
 - Tightening torque $M_A = 100^{+20} \text{ Nm}$ (< 250 bar)
 - Tightening torque $M_A = 120^{+20} \text{ Nm}$ (> 250 bar)
- 6 Solenoid nut, tightening torque $M_A = 5^{+1} \text{ Nm}$

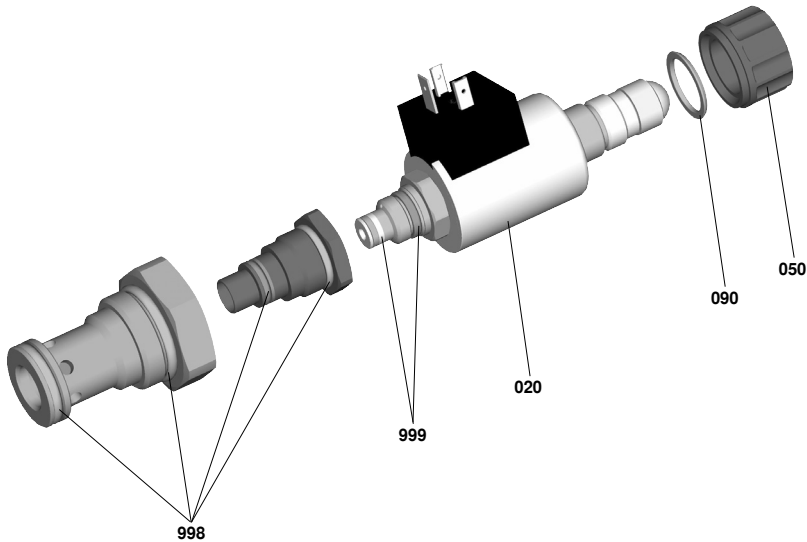
Mounting cavity R/ISO 7789-33-01-0-98; 2 main ports; thread M33 x 2
 (dimensions in mm)



1) Different from ISO 7789-33-01-0-98
 2) Depth of fit
 3) Optional

① = Main port 1
 ② = Main port 2
 LS = Location shoulder

Available individual components



Item	Designation		DC	Material no.
020	Coil for individual connection ¹⁾	Version K4	12 V 24 V 24 V / 800 mA	R901002932 R901002319 R901049962
		Version K40	12 V 24 V 24 V / 800 mA	R901003055 R901003053 R901050010
		Version C4	12 V 24 V 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pressure tube			R900007769
998	Main stage seal kit			R961001025
999	Pilot valve seal kit			R961000376

¹⁾  **Note!**
After the solenoid coil was replaced, the factory-set pressure may change by ±5 %.

Notes

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Proportional flow control valve,
with integrated pressure compensator

Type KUDSR

RE 18702

Edition: 2012-03

Replaces: 05.11



- Size 3
- Component series A
- Maximum operating pressure 350 bar
- Maximum flow 120 l/min

Features

- Mounting cavity R/UNF-16-03-0-06
- Direct operated proportional valve for controlling the flow size
- Operation by means of proportional solenoid with central thread and detachable coil
- Rotatable solenoid coil
- With concealed manual override
- Screwable manual override with star handle, optional

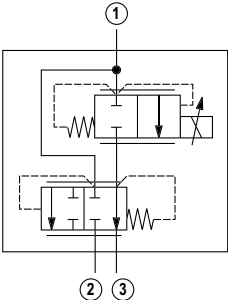
Contents

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Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09
KUDS	R	3		A	/	F	N9	V *

01	Proportional flow control valve, with integrated pressure compensator, direct operated	KUDS
02	Maximum operating pressure 350 bar	R
03	Size 3	3

Symbol		
04		Flow in the main port ①
		80 l/min
		60 l/min
		40 l/min

05	Component series	A
06	High Performance and mounting cavity R/UNF-16-03-0-06, see page 13	F
07	With concealed manual override ²⁾	N9

Seal material		
08	FKM seals	V
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	
09	Further details in the plain text	*

¹⁾ Complete valves with mounted coil on request.

²⁾ Screwable manual override with star handle "N14" (separate order, material no. **R913009058**, see page 12).

Valve types (without coil) ¹⁾

Type	Material no.
KUDSR3CA/FN9V	R901255657
KUDSR3C1A/FN9V	R901287409
KUDSR3C2A/FN9V	R901265879

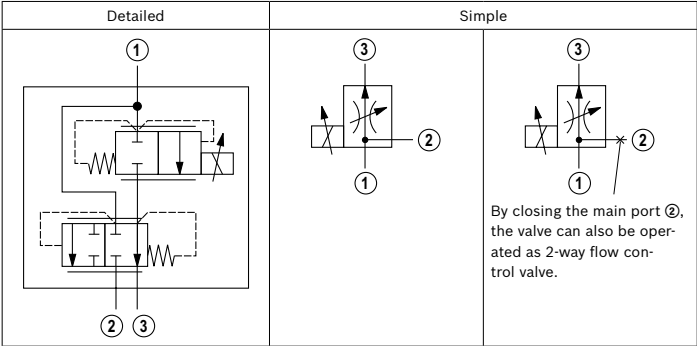
Available coils (separate order) ¹⁾

	Material no. for coil with connector ³⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
Direct voltage DC ⁴⁾			
12 V (1.8 A)	R901022180	R901272648	R901022680
24 V (1.2 A)	R901022174	R901272647	R901022683

³⁾ Mating connectors, separate order, see data sheet 08006.

⁴⁾ Other voltages upon request.

Symbols



- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

Function

General

The proportional flow control valve is a direct operated cartridge valve in spool design with integrated pressure compensator. It regulates the flow proportionally to the input signal in a continuous form from the main port ① to ③. Superfluous residual flow is led to the tank or to another actuator via the port ②.

The valve basically comprises of housing, control spool, control spring, pressure compensator piston, orifice bush, pressure compensator spring as well as proportional solenoid (1) with central thread and detachable coil.

Function

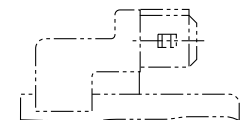
With de-energized proportional solenoid (1), the control spool that is always pressure-compensated to the actuating forces due to its structural design is held in the initial position by the control spring and blocks the flow between main port ① and ③. By energizing the proportional solenoid (1), the control spool is adjusted directly proportional to the electrical input signal and, via orifice-like cross-sections (with progressive flow characteristic), connects the main ports ① and ③. Due to the integrated pressure compensator piston together with the pressure compensator spring, the pressure drop across the valve is kept constant, independent of the pressures at ①, ② and ③. In case of superfluous flow from ① the pressure compensator piston moves to the right and opens the connection ① to ②. In case of de-excitation of the proportional solenoid (1), the control spring returns the control piston into its initial position. The whole flow is now directly led from main port ① to main port ②.

The manual override (2) allows for the adjustment of the valve without solenoid energization.

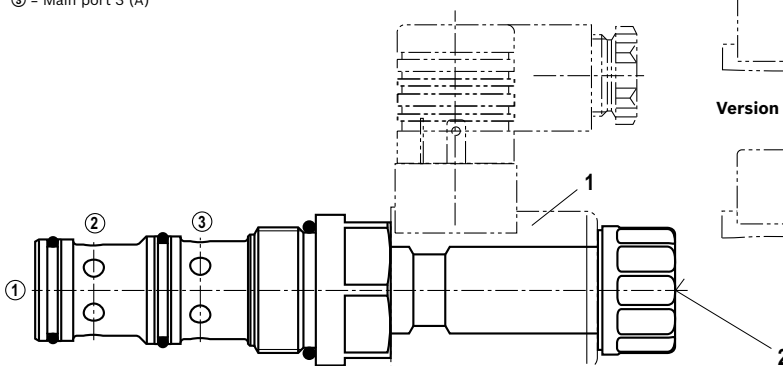
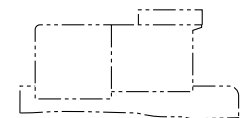
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

Version "K4"
(with mating connector)

Version "C4"



Version "K40"



Type KUDSR3...

Technical data

(For applications outside these parameters, please consult us!)

general		
Weight	kg	0.97
Installation position	Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.	
Ambient temperature range	°C	see page 11
Storage temperature range	°C	-20 to +80

Environmental audits

Salt spray test according to DIN 50021	h	720
Surface protection DC solenoids	Coating according to DIN 50962-Fe//ZnNi with thick film passivation	

hydraulic			
Maximum operating pressure	- Main port ①	bar	350
Bypass pressure	- Main port ②	bar	350 with q_{Vmax}
Prio pressure	- Main port ③	bar	330 with q_{Vmax}
Control pressure differential	- ① to ③	bar	12 to 15
Minimum pressure differential	- ① to ③	bar	> 10
Maximum flow	- Main port ①	l/min	120
Rated flow	- ① to ③	l/min	80 (regulated)
Leakage		ml/min	< 100 (with $\Delta p = 100$ bar in ①; HLP46, $\theta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-40 to +100 (preferably +40 to +50)
Viscosity range		mm²/s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Load cycles		Million	10
Hysteresis ²⁾		%	≤ 5
Range of inversion ²⁾		%	≤ 2
Response sensitivity ²⁾		%	≤ 1

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	- Insoluble in water	HEES	VDMA 24568
	- Soluble in water	HEPG	

Important information on hydraulic fluids!

- For more information and on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

► **Bio-degradable:** When using bio-degradable hydraulic fluids that are simultaneously zinc-solvent, zinc may accumulate in the fluid.

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

²⁾ Measured with analog amplifier type RA2-1/10 according to data sheet 95230 (PWM = 100 Hz).

Technical data
 (For applications outside these parameters, please consult us!)

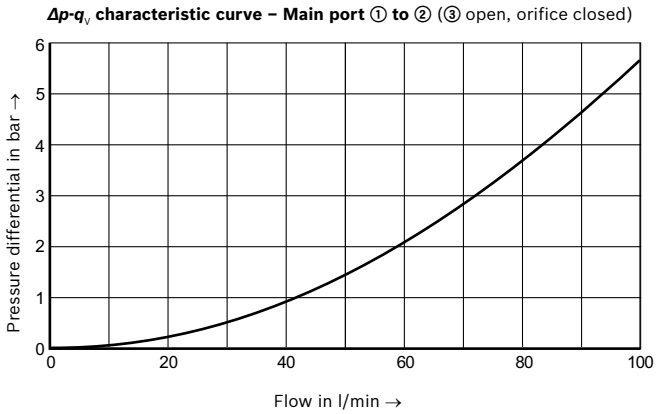
electric			
Voltage type		Direct voltage	
Supply voltages ³⁾		V	12 DC

³⁾ Other voltages upon request
⁴⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

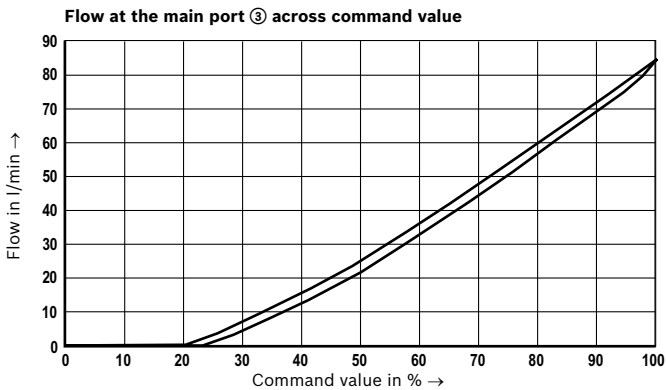
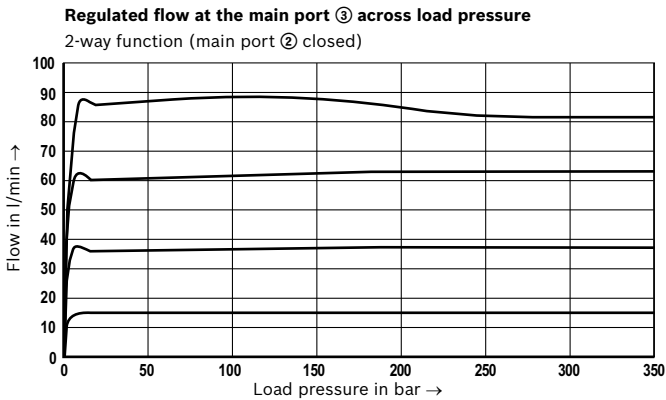
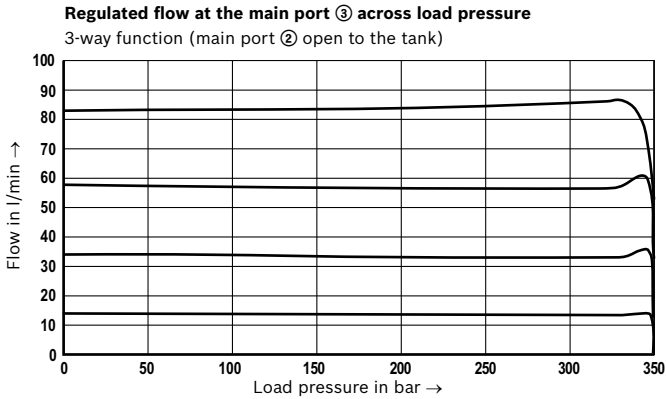
When establishing the electrical connection, the protective earthing conductor (PE $\pm$) has to be connected properly.

Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

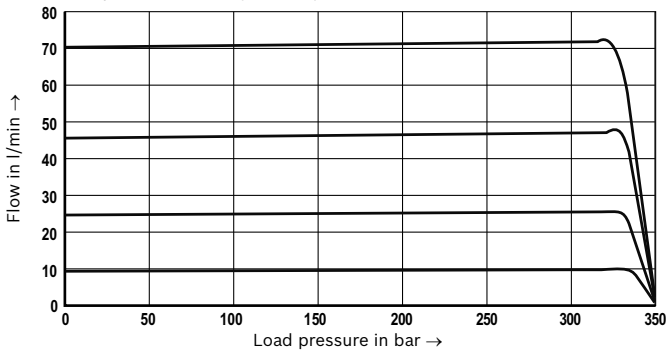


Characteristic curves: Version "C"
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{V0} = 80 \text{ l/min}$)

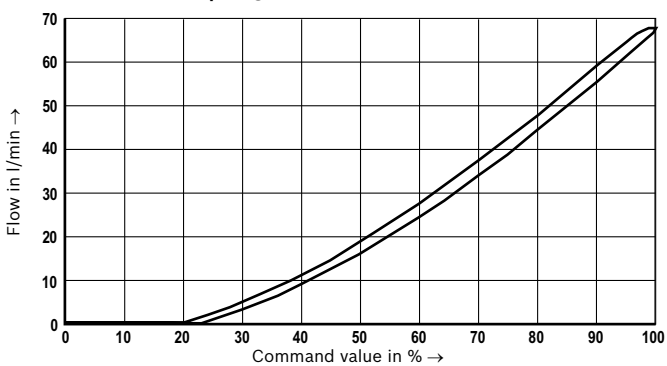


Characteristic curves: Version "C1"(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{v0} = 60 \text{ l/min}$)**Regulated flow at the main port ③ across load pressure**

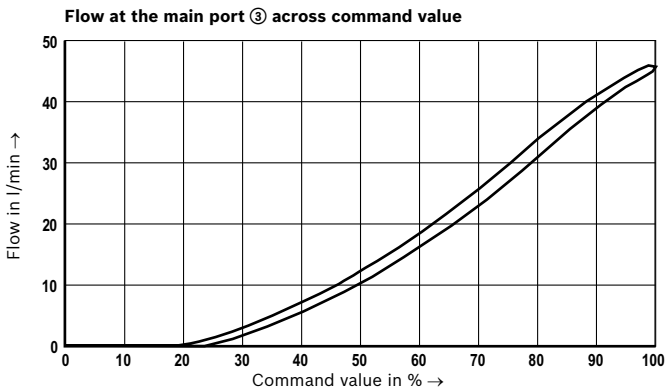
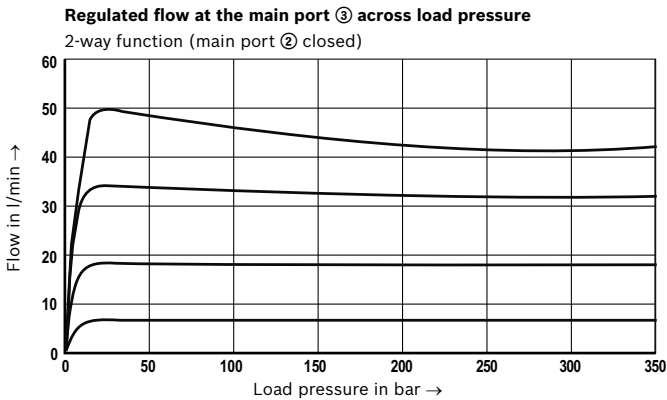
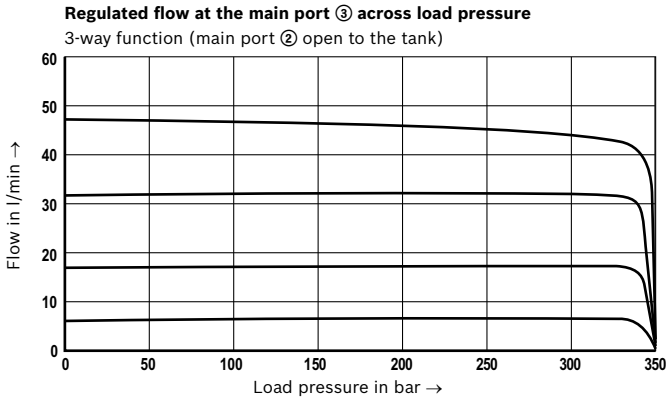
3-way function (main port ② open to the tank)

**Regulated flow at the main port ③ across load pressure**

2-way function (main port ② closed)

**Flow at the main port ③ across command value**

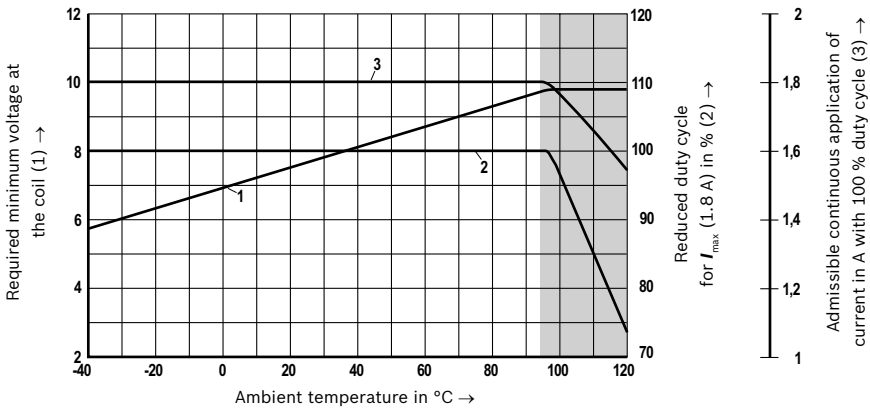
Characteristic curves: Version "C2"
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and $q_{V\textcircled{3}} = 40 \text{ l/min}$)



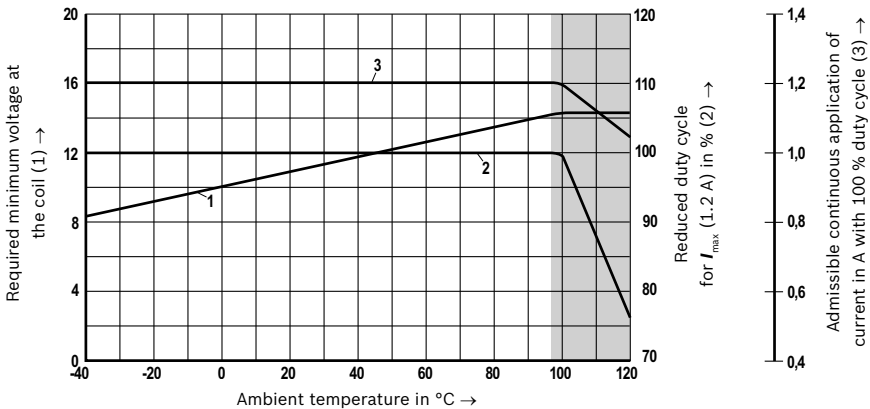
Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature

- Version "G12"



- Version "G24"



Limited valve performance

Notices!

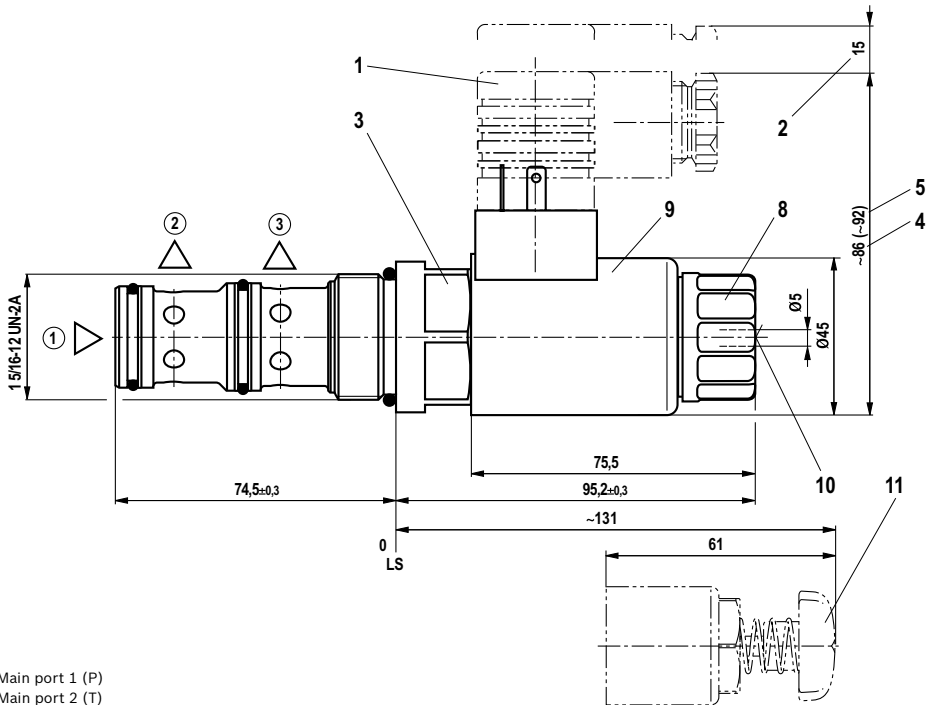
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions

(dimensions in mm)



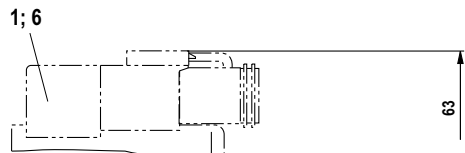
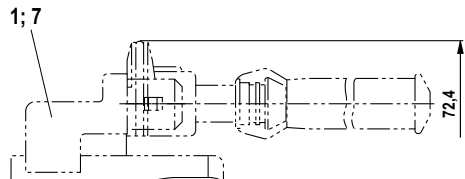
① = Main port 1 (P)

② = Main port 2 (T)

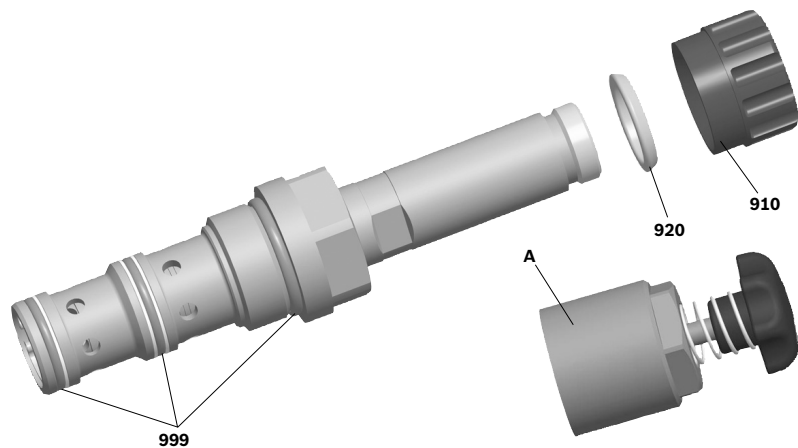
③ = Main port 3 (A)

LS = Location Shoulder

- 1 Mating connector without circuitry for connector "K4" (separate order, see data sheet 08006)
- 2 Space required to remove the mating connector
- 3 SW36, tightening torque $M_A = 165^{+15}_{-10}$ Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Mating connector for connector "K40" (separate order, see data sheet 08006)
- 7 Mating connector for connector "C4" (separate order, see data sheet 08006)
- 8 Nut, tightening torque $M_A = 5^{+2}_{-1}$ Nm
- 9 Coil (separate order, see page 3)
- 10 Concealed manual override "N9"
- 11 Screwable manual override with star handle "N14" (separate order, see page 3)



Available individual components



Item	Denomination	Material no.
910	Nut	R900029574
920	O-ring for pole tube	R900002507
999	Seal kit of the valve	R961003236
A	Manual override "N14"	R913009058

Coils, separate order, see page 3.

More information

- ▶ Control electronics:
 - Analog amplifier module type VT-MSPA1...
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
 - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30223
Data sheet 30116
Data sheet 95230
Data sheet 95200
www.boschrexroth.com/filter

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4/3 proportional directional spool valve, direct operated, with solenoid actuation

Type VEPS..43

RE 18162

Edition: 2012-05



- Frame size 10
- Component series 0
- Maximum operating pressure 350 bar
- Maximum flow 25 l/min

Features

- Mounting cavity R/UNF10-04-0-06
- Direct operated proportional directional spool valve with solenoid actuation for controlling the flow size
- Wet-pin DC solenoids
- Rotatable solenoid coil
- Manual override, optional

Contents

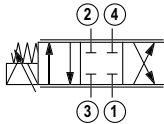
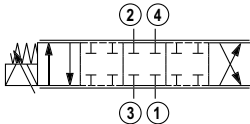
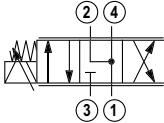
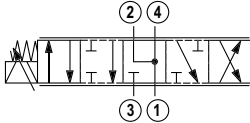
Features	1
Ordering code, valve types	2
Available coils	3
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Limits of performance	10
Minimum terminal voltage at the coil and relative duty cycle	11 ... 12
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Ordering code (valve without coil) ¹⁾

01	02	03	04	05	06	07	08	09	10	11	12
VEPS	-	10A	-	43		OD14		78	KP2	0	0

01	Proportional directional spool valve, direct operated, electrically operated	VEPS
02	Frame size 10	10A
03	4/3 directional design	43

Symbols

04			10
			20
05	Without manual override		0
	With pull/push manual override		-M1
06	4/3 proportional directional spool valves, direct operated, with solenoid actuation		OD14

Symbols

07	See item 04	10
		20
08	Frame size 10: R/UNF 10-04-0-06, see page 14	78
09	Proportional valve with 2 coils	KP2
10	Without manual override	0
	With pull/push manual override	1
11	Standard version	0
12	Revision status	0

Valve types (without coil) ¹⁾

Symbol	Without manual override "0"		With pull/push manual override "-M1", "1"		
	Type	Material no.	Type	Material no.	
10	VEPS-10A-4310 OD141078KP2000	R901271834	VEPS-10A-4310-M1 OD141078KP2100	R901300077	
20	VEPS-10A-4320 OD142078KP2000	R901271837	VEPS-10A-4320-M1 OD142078KP2100	R901300083	

Available coils (separate order) ¹⁾

Direct voltage DC ³⁾	Material no. for coil with connector ²⁾		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
12 V	R901002932	R901003055	R901003044
24 V / 1200 mA	R901002319	R901003053	R901003026
24 V / 800 mA	R901049962	R901050010	R901049963

¹⁾ Complete valves with mounted coil on request.

²⁾ Mating connectors, separate order, see data sheet 08006.

³⁾ Other voltages upon request.

Function, section, symbols

General

The 4/3 proportional directional spool valves are direct operated, pressure-compensated cartridge valves. They regulate the flow proportionally to the input signal in a continuous form from the main port ③ to ② or ③ to ④. The valve basically consists of:

- Pole tube (1), socket (2), a control spool (5) as well as a return spring (4).

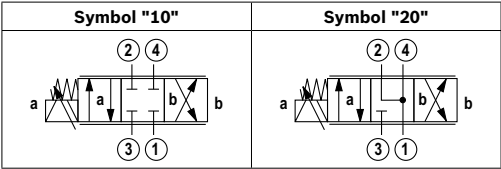
Function

In the de-energized condition, the control spool (5) is held in the initial position by the return spring (4). By energizing the solenoid (3), the control spool (5) is adjusted directly - proportional to the electrical input signal - and connects

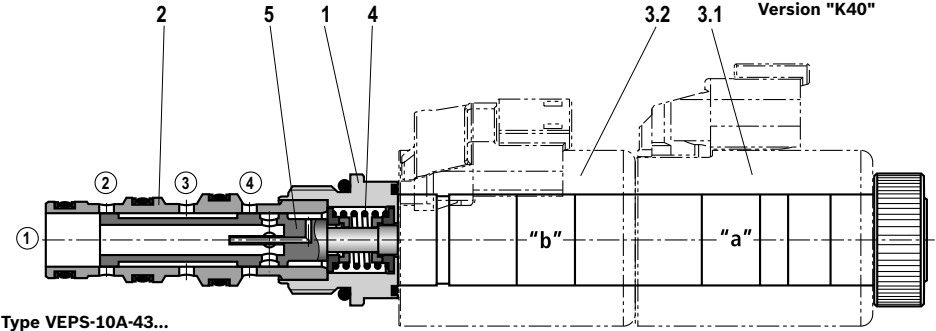
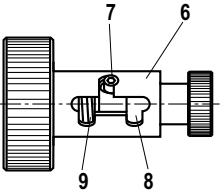
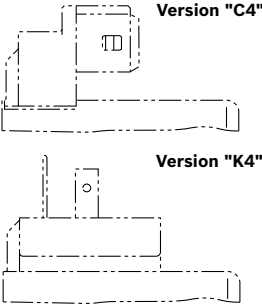
the main ports ③ with ② or ③ with ④. The symbols are realized by different spools ("10" and "20"). In case of de-excitation of the solenoid (3), the return spring (4) returns the control spool (5) into its initial position. Main ports ②, ③ and ④ can be permanently pressurized with an operating pressure of 350 bar. The ports have a fixed pin assignment (see symbols). At port ① there must be a maximum pressure of 100 bar. The manual override (6) allows for the switching of the valve without solenoid energization.

⚠ Attention!

If the valve is not installed or installed in a system that is not completely bled, the valve must not be energized as otherwise, the entering air has a very negative effect on the valve's dynamic behavior.



- ① = Main port 1 (T)
 - ② = Main port 2 (A)
 - ③ = Main port 3 (P)
 - ④ = Main port 4 (B)
-
- 7 Initial position
 - 8 Spool position "b"
 - 9 Spool position "a"



Technical data

(For applications outside these parameters, please consult us!)

general			
Weight	– Valve	kg	0.35
	– Coil	kg	0.25 each
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.	
Ambient temperature range		°C	–40 to +120 (see page 11 and 12)
Storage temperature range		°C	–20 to +80

Environmental audits

Salt spray test according to DIN 50021	h	720
Surface protection DC solenoids	Coating according to DIN 50962-Fe//ZnNi with thick film passivation	

hydraulic			
Maximum operating pressure	– Connection ②, ③, ④	bar	350
	– Connection ①	bar	100
Maximum flow		l/min	25
Step response	0 to 100 %; 100 to 0 %	ms	< 180 (with $p_s = 10$ bar)
Leakage		ml/min	< 60 per control edge (with $\Delta p = 100$ bar; HLP46, $\theta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +100 (preferably +40 to +50)
Viscosity range		mm²/s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾
Hysteresis ²⁾			≤ 5
Range of inversion ²⁾			≤ 2
Response sensitivity ²⁾			≤ 1
Load cycles			2 million ³⁾

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	VDMA 24568
	– Soluble in water	HEPG	

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

► **Bio-degradable:** When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter.

²⁾ Measured with analog amplifier type RA2-1/10; see data sheet 95230

³⁾ Rexroth standard test condition (HLP46; $\theta_{oil} = 40$ °C ±5 °C)

Technical data
 (For applications outside these parameters, please consult us!)

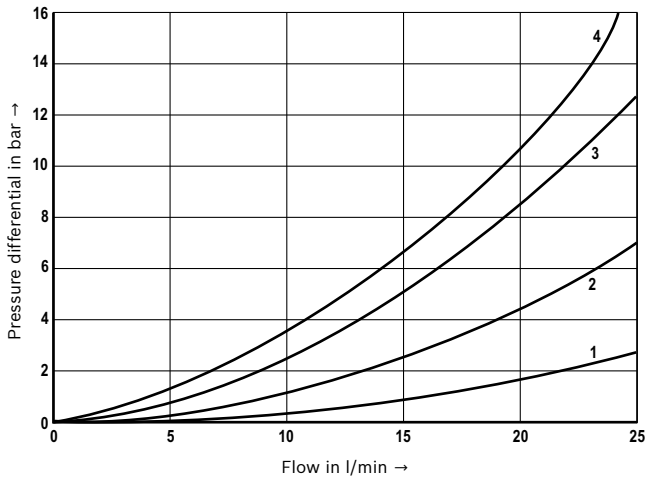
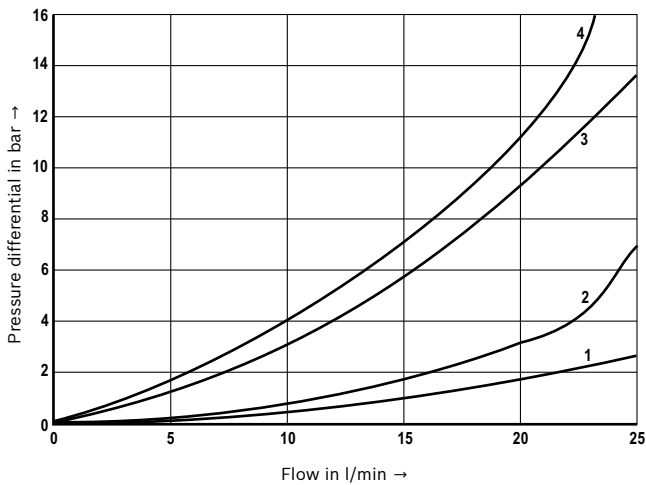
electric					
Voltage type		Direct voltage			
Supply voltages ⁴⁾		V	12 DC	24 DC	24 DC
Maximum solenoid current		A	1760 mA	1200 mA	800 mA
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8	11.5
	– Max. hot value	Ω	3.8	7.9	18.5
Duty cycle		%	see characteristic curve page 11 and 12 ⁵⁾		
Maximum coil temperature ⁶⁾		°C	150		
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	– Version "K4"	IP 65 with mating connector mounted and locked			
	– Version "C4"	IP 66 with mating connector mounted and locked			
		IP 69K with Rexroth mating connector (material no. R901022127)			
	– Version "K40"	IP 69K with mating connector mounted and locked			
		Plug-in proportional amplifier			Data sheet 30116
		type VT-SSPA1...			
		Analog amplifier type RA...			Data sheet 95230
Design according to VDE 0580					

⁴⁾ Other voltages upon request.

⁵⁾ In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

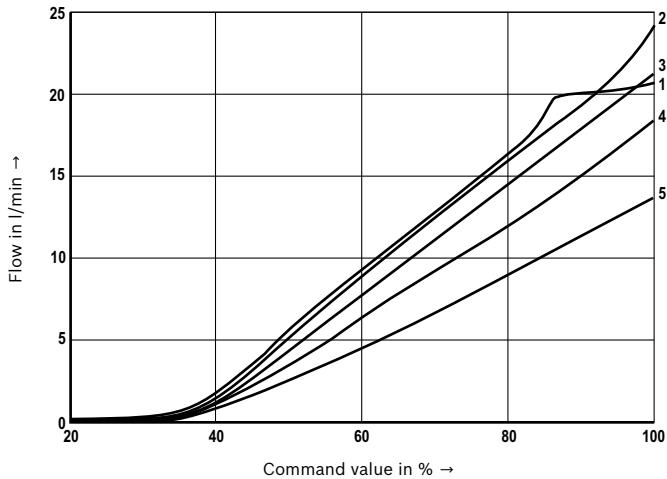
When establishing the electrical connection, the protective earthing conductor (PE $\frac{1}{2}$) has to be connected properly.

Characteristic curves(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil) **Δp - q_v characteristic curves – Symbol "10"** **Δp - q_v characteristic curves – Symbol "20"**

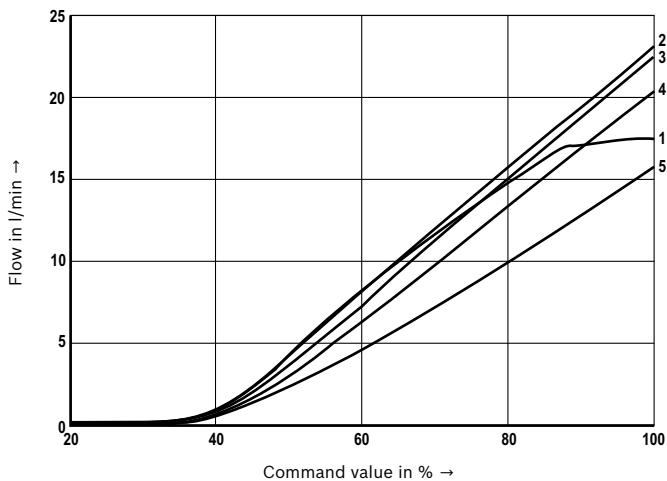
1	② → ①
2	④ → ①
3	③ → ④
4	③ → ②

Characteristic curves
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

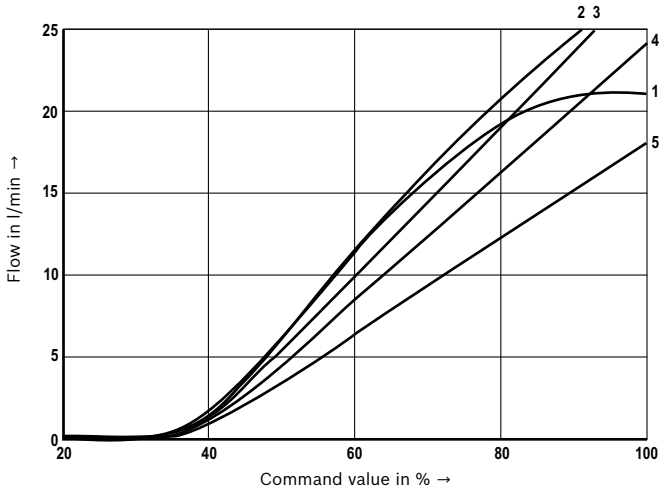
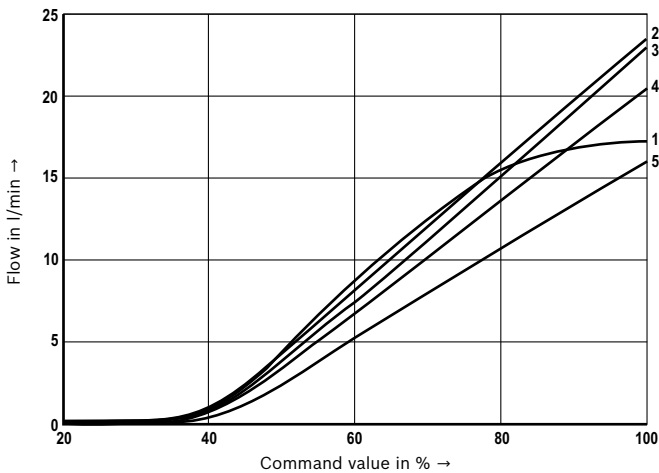
Direction of flow 3 → 2
Symbol "10"



Direction of flow 3 → 4
Symbol "10"

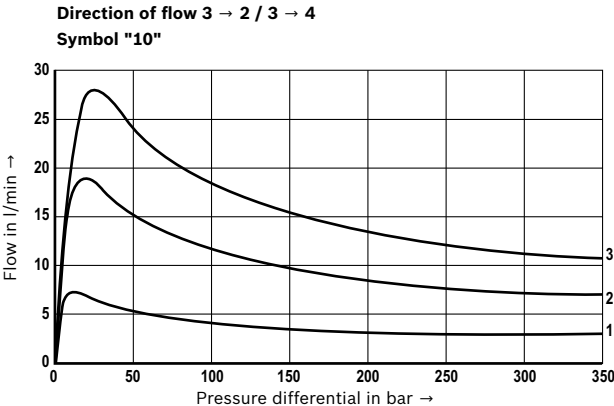
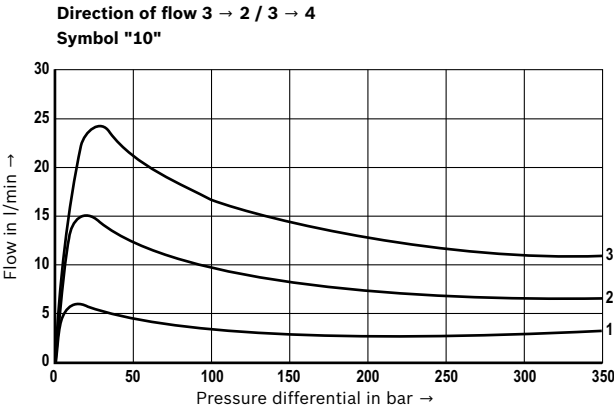
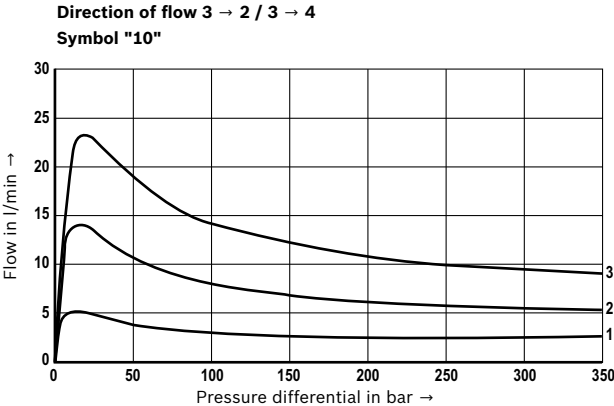


- 1 $\Delta p = 10 \text{ bar constant}$
- 2 $\Delta p = 20 \text{ bar constant}$
- 3 $\Delta p = 30 \text{ bar constant}$
- 4 $\Delta p = 50 \text{ bar constant}$
- 5 $\Delta p = 100 \text{ bar constant}$

Characteristic curves(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)**Direction of flow 3 → 2**
Symbol "20"**Direction of flow 3 → 4**
Symbol "20"

- 1 $\Delta p = 10 \text{ bar constant}$
- 2 $\Delta p = 20 \text{ bar constant}$
- 3 $\Delta p = 30 \text{ bar constant}$
- 4 $\Delta p = 50 \text{ bar constant}$
- 5 $\Delta p = 100 \text{ bar constant}$

Limits of performance
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

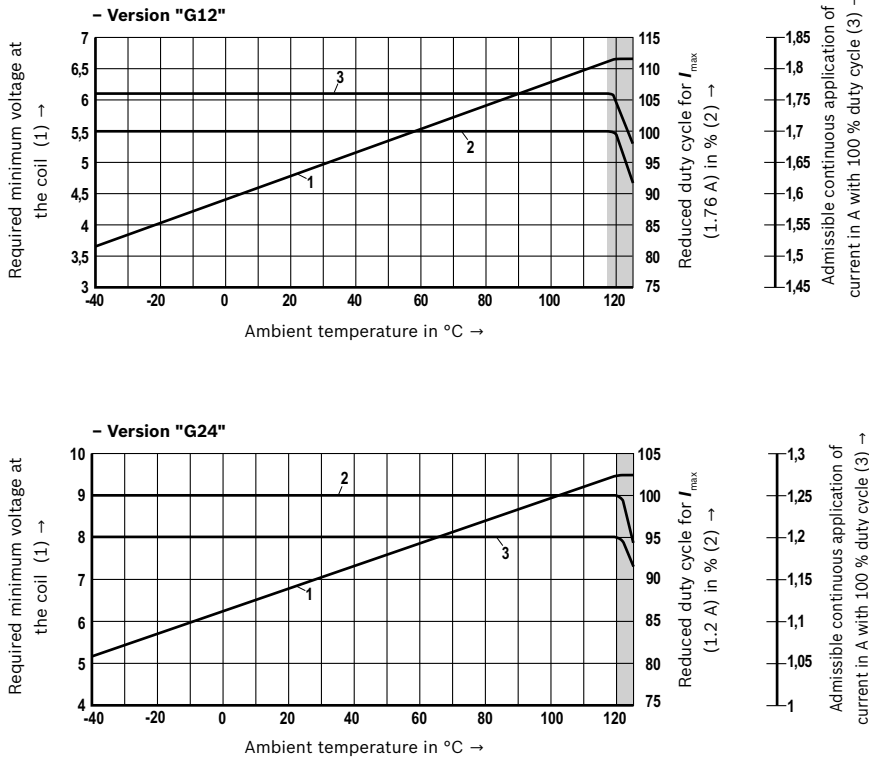


- 1 Command value = 50 %
- 2 Command value = 75 %
- 3 Command value = 100 %

⚠ Attention!
The specified limits of performance are valid for operation with two directions of flow (e.g. from ③ to ② and simultaneous return flow from ④ to ①).
Due to the current forces acting within the valves, the permissible performance limit may be considerably lower with only one direction of flow (e.g. from ③ to ② and blocked port ④)!
In such applications, please consult us!
The performance limit was determined when the solenoids were at operating temperature, at 10% undervoltage and without tank pre-loading.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance



Notice!

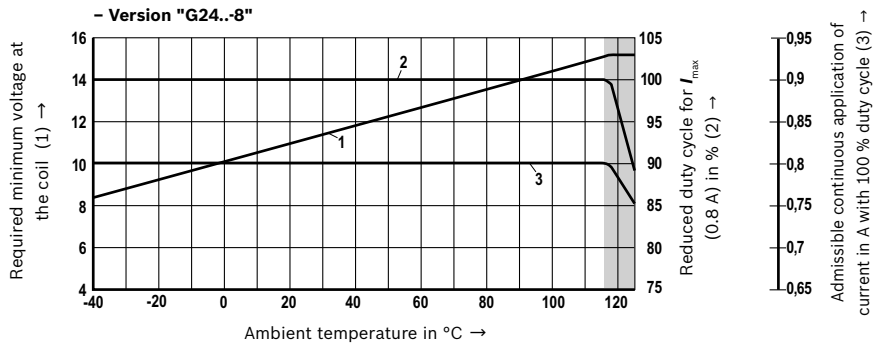
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Minimum terminal voltage at the coil and relative duty cycle

Admissible working range against the ambient temperature



Limited valve performance



Notice!

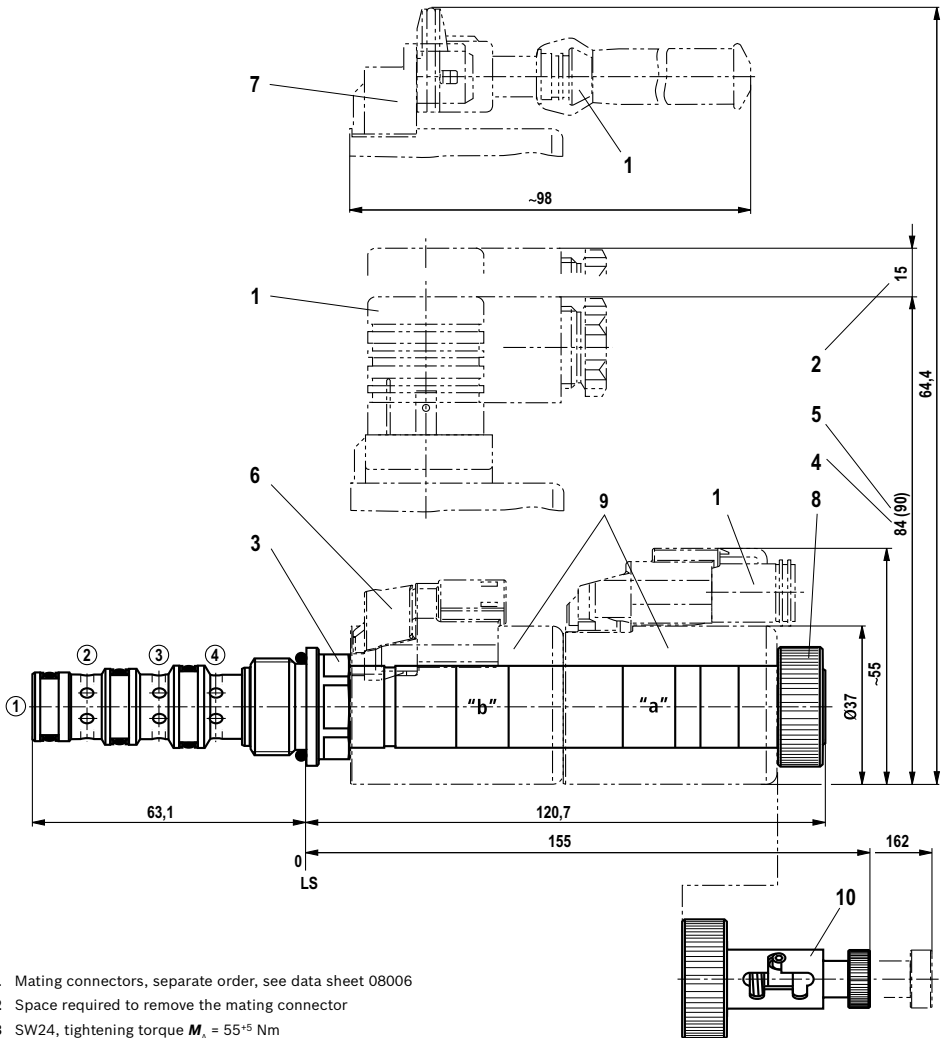
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

Unit dimensions

(dimensions in mm)

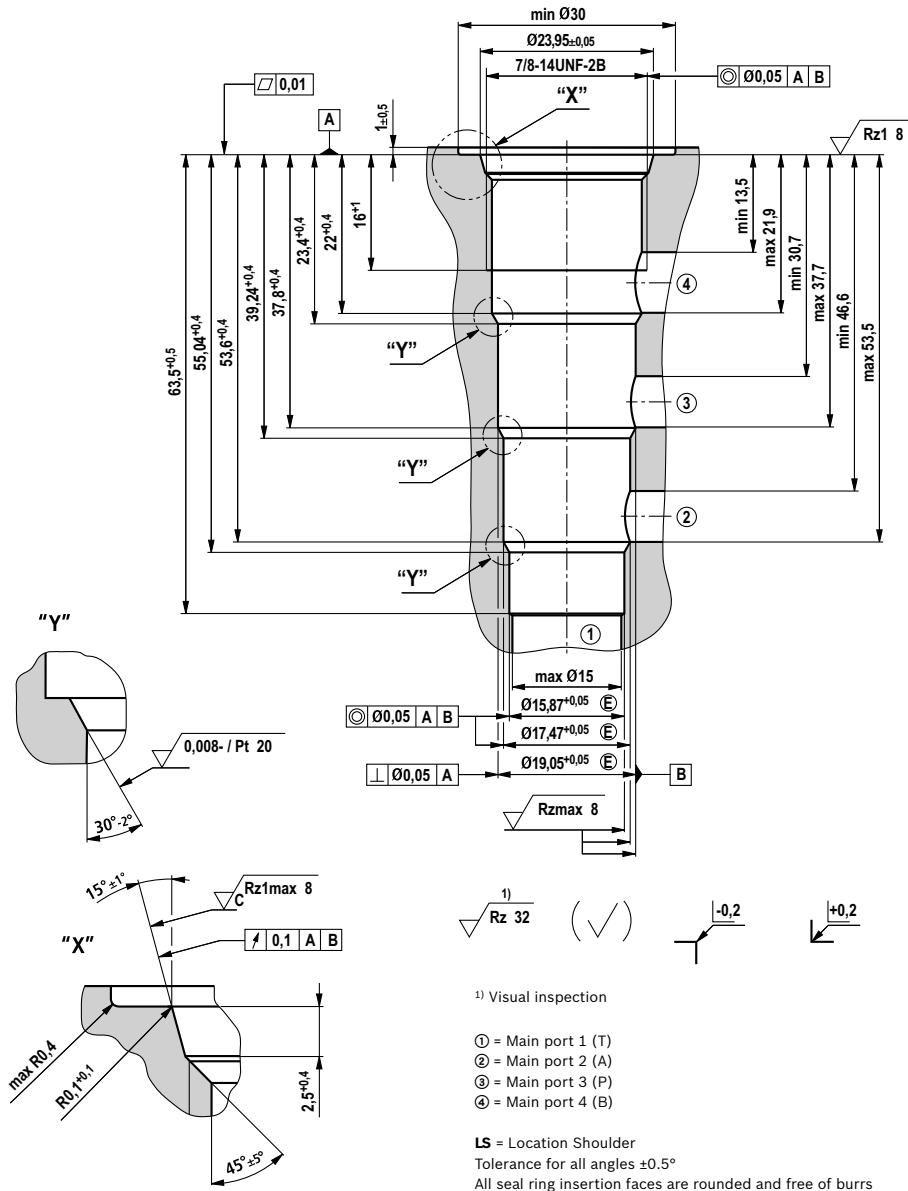


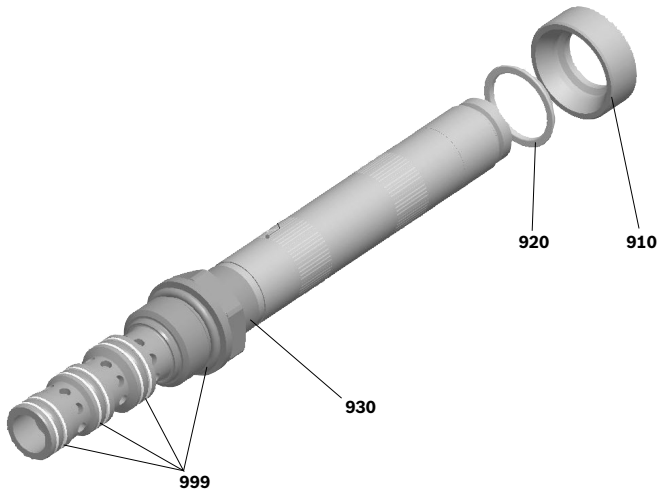
- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque $M_A = 55^{+5}$ Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque $M_A = 5^{+1}$ Nm
- 9 Coil (separate order, see page 3)
- 10 Pull/push manual override "1"

- ① = Main port 1 (T)
- ② = Main port 2 (A)
- ③ = Main port 3 (P)
- ④ = Main port 4 (B)

LS = Location Shoulder

Mounting cavity R/UNF-10-04-0-06; 4 main ports; thread 7/8-14UNF-2B (dimensions in mm)



Available individual components

Item	Denomination	Material no.
910	Nut	R901241052
920	O-ring for pole tube	R900007769
930	O-ring for pole tube	R913014944
999	Seal kit of the valve	R961005190

Coils, separate order, see page 3

More information

- ▶ Control electronics:
 - Plug-in proportional amplifier type VT-SSPA1...
 - Analog amplifier type RA...
- ▶ Selection of the filters

Data sheet 30116

Data sheet 95230

www.boschrexroth.com/filter

Notes

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Plug-in proportional amplifier

RE 30116/09.10
Replaces: 06.10

1/8

Type VT-SSPA1-1, VT-SSPA1-5, VT-SSPA1-50,
VT-SSPA1-100, VT-SSPA1-150

Component series 1X

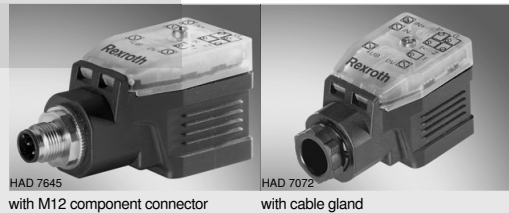


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Features

- Used for controlling solenoid operated pressure control and directional valves without closed-loop position control
- Proportional command value / current characteristic curves for command values from 0 % to 100 %
- Regulated, adjustable maximum current for a command value greater than approx. 120 % (only with differential input)
- Differential input, optional current input
- Ramp generator, separate for up/down
- Zero potentiometer / biasing current
- Command value attenuator / maximum current
- Dither frequency potentiometer
- Operating voltage 24 V

Ordering code

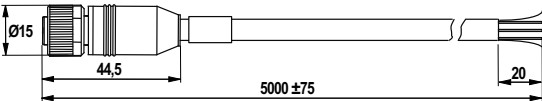
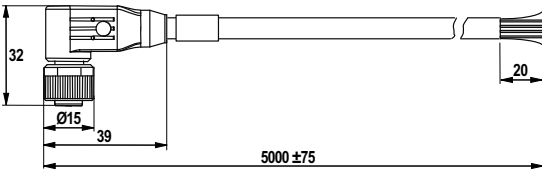
VT-SSPA1- -1X/V0/0-24/				No code = K24 = 24 = 0 =		With cable gland With M12 component connector 24 V operating voltage Voltage input
for DBET / DRE	= 1					
for KBPS...8	= 5					
Universal, 2.5 A	= 50					
for KKDSR	= 100					
Universal, 0.8 A	= 150					

Overview of types

Type	Mat. no.	U _B	I _{nom}	f at I _{nom}	Command value	For valve	Solenoid	
VT-SSPA1-1-1X/V0/0-24	R900779643	24 V	1,6 A	340 Hz	0...10 V/24 V	DBET / DRE	5,5 Ω	1,6 A
VT-SSPA1-1-1X/V0/0-24/K24	R901238534	24 V	1,6 A	340 Hz	0...10 V/24 V	DBET / DRE	5,5 Ω	1,6 A
VT-SSPA1-5-1X/V0/0-24	R901024331	24 V	1,2 A	200 Hz	0...10 V/24 V	KBPS...8	4,77 Ω	1,2 A
VT-SSPA1-5-1X/V0/0-24/K24	R901238530	24 V	1,2 A	200 Hz	0...10 V/24 V	KBPS...8	4,77 Ω	1,2 A
VT-SSPA1-50-1X/V0/0-24	R901005414	24 V	2,5 A	305 Hz	0...10 V/24 V	universal	> 2 Ω	2,5 A
VT-SSPA1-50-1X/V0/0-24/K24	R901238532	24 V	2,5 A	305 Hz	0...10 V/24 V	universal	> 2 Ω	2,5 A
VT-SSPA1-100-1X/V0/0-24	R901030116	24 V	1,2 A	150 Hz	0...10 V/24 V	KKDSR1	7,2 Ω	1,2 A
VT-SSPA1-100-1X/V0/0-24/K24	R901238528	24 V	1,2 A	150 Hz	0...10 V/24 V	KKDSR1	7,2 Ω	1,2 A
VT-SSPA1-150-1X/V0/0-24	R901104644	24 V	0,8 A	150 Hz ¹⁾	0...10 V	universal	19,5 Ω	0,8 A
VT-SSPA1-150-1X/V0/0-24/K24	R901263782	24 V	0,8 A	150 Hz ¹⁾	0...10 V	universal	19,5 Ω	0,8 A

¹⁾ With a solenoid resistance of R = 19.5 Ω and a solenoid current of I = 100 mA

Accessories for type .../K24

Description	Designation	Mat. no.
Ready-to-connect cable with straight mating connector	KABELSATZ VT-SSPA1-1X/M12/1/V00	R901241656
		Cable sheat: PVC, black Cable diameter: 6.4 mm Wire cross-section: 4 x 0.75 mm ² Cable and mating connector are shielded Electrical connection, see page 6
Ready-to-connect cable with angled mating connector	KABELSATZ VT-SSPA1-1X/M12/2/V00	R901241651
		Cable sheat: PVC, black Cable diameter: 6.4 mm Wire cross-section: 4 x 0.75 mm ² Cable and mating connector are shielded Electrical connection, see page 6

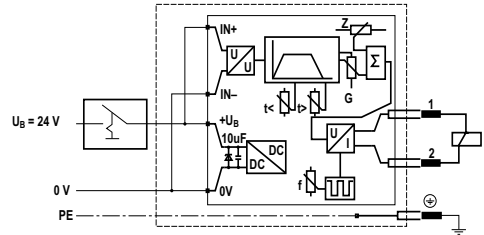
Possible applications

2-conductor technology (only with differential input)

- Switching applications with constant-current regulation
- Ramp function when switched on

The "IN+" input is to be bridged with the supply voltage ($+U_B$) in the plug-in connector, the "IN-" input is to be bridged with the supply voltage (0 V) in the plug-in connector.

The maximum current must usually be matched according to the solenoid data using potentiometer "G". The ramp time "ramp up" ($t <$) can be adjusted within the range of $t_{\min}$ ms to 5 s.

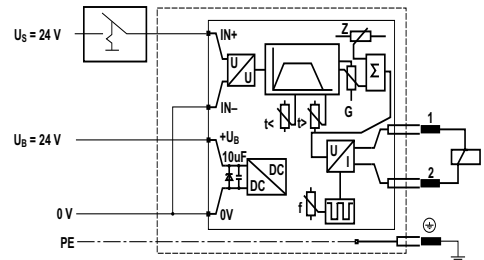


3-conductor technology (only with differential input)

- Switching applications with constant-current regulation
- Switching with low control power
- Ramp function, when the control voltage is switched on or off, can be separately adjusted

The "IN-" input is to be connected to the control voltage ($U_S = 24$ V), the "IN+" input is to be bridged with the supply voltage (0 V) in the plug-in connector.

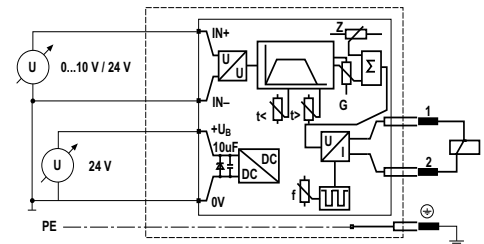
The maximum current must usually be matched according to the solenoid data using potentiometer "G". In the de-energized condition ("IN+" = 0 V or "IN+" = open) a biasing current can be set on "Z". This biasing current can be used to reduce the switch-on delay, especially in conjunction with a ramp. If required, a value of between approx. 20 mA and approx. 15 % of the nominal current can be set. The ramp times "ramp up" ($t <$) and "ramp down" ($t >$) can be adjusted within the range of $t_{\min}$ to 5 s.



4-conductor technology

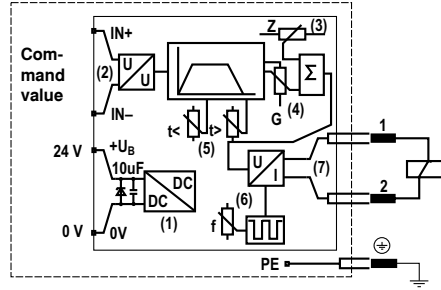
- The "IN+" input is to be connected to the control signal ($U_S = 0 \dots 10$ V/24 V), the "IN-" input is to be connected to the reference potential of the control voltage.

The biasing current and the maximum current have to be adjusted by means of potentiometers "Z" and "G" before commissioning. The current can then be adjusted proportionally between the set biasing current and the set maximum current according to the control voltage. The biasing current can be adjusted within the range of approx. 0 mA to approx. 15 % of the nominal current, the maximum current within the range of 0 to $I_{\max}$ (see technical data on page 5).

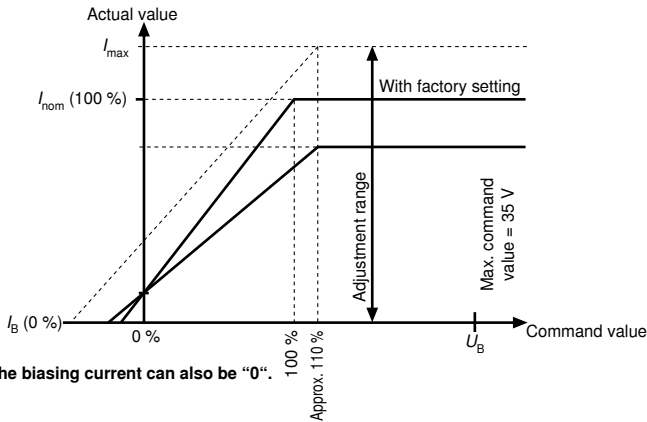


Block circuit diagram

- (1): Internal voltage adjustment
- (2): Command value input
- (3): Zero point potentiometer "Z" / biasing current I ($I_N = 0\%$)
- (4): Command value attenuator "G" / maximum current I ($I_N = 100\%$)
- (5): Ramp time potentiometers " $t <$ " and " $t >$ "
- (6): Frequency range correction " f "
- (7): Current output stage



Characteristic curve



Note:

Depending on the type, the biasing current can also be "0".

Function

The plug-in amplifier is suitable for mounting onto a valve connection base according to EN 175301-803. By turning the plug insert and the electronics in the housing, the plug-in amplifier can be mounted on the solenoid in 90° increments.

Command value feedforward

The command value range is between 0 and U_B . In the command value range 0...10 V the solenoid current is proportional to the command value. From a command value of approx. 12 V up to U_B the solenoid current is almost constant according to the I_{max} setting (switching application).

Ramp generator

Ramp generator (5) limits the gradient of the control variable. The ramp times can be adjusted separately for up and down ramps. In switching applications, the ramps can be used to dampen the switch-on and switch-off impulse (in the case of switching off, with 3-conductor connection only, i.e. switching signal and supply are connected separately). This characteristic also depends on the valve and solenoid type. The downstream command value attenuator (4) has no influence on the ramp time.

Characteristic curve

Up to a command value of approx. 110 % the transfer characteristic curve rises linearly. The zero point can be corrected by means of potentiometer "Z", the maximum value using potentiometer "G".

Current output stage

Output stage (7) is self-clocking. The clock frequency depends on the current intensity, the operating voltage and the impedance of the controlled solenoid. The clock frequency can be re-adjusted by means of potentiometer "f". The current output stage generates a regulated current signal according to the control variable provided by summator (3). Too high a clock frequency results in an increase in the valve hysteresis. Too low a clock frequency increases the noise level of the hydraulic system.

Technical data (for applications outside these parameters, please consult us!)

Type		VT-SSPA1-1	VT-SSPA1-5	VT-SSPA1-50	VT-SSPA1-100	VT-SSPA1-150
Operating voltage 24 V	U_B	24 VDC				
	$u(t)_{\max}$	35 V				
	$u(t)_{\min}$	18 V				
Maximum cable inductance ¹⁾	$L_{\max}$	100 μ H				
Current / power consumption (depending on solenoid data)	I [A] $P_{\max}$ [VA]	< 1.7 < 40	< 1.7 < 40	< 2.6 < 60	< 1.7 < 40	< 1.2 < 30
Recommended back-up fuse	I [A]	2; slow-blow	2; slow-blow	3,15; slow-blow	2; slow-blow	1.5; slow-blow
Minimum coil inductance	$L_{\min}$ [mH]	15	15	10	15	15
Biasing current (adjustment range)	I_B [mA]	0...300	0...300	0...350	0...250	0...200
Biasing current (factory setting)	I_B [mA]	100	0	100	0	100
Nominal current (factory setting)	I [A]	1.6	1.2	2.5	1.2	0.8
Maximum current (adjustment range)	$I_{\max}$ [A]	I_B ...1.7	I_B ...1.8	I_B ...2.6	I_B ...1.7	I_B ...0.8
Clock frequency at $I_{\max}$	f [Hz]	340	200	305	150	150 ²⁾
Command value input (voltage)						
Proportional range	U	0...10 V				
Switching range	U	12 V... U_B				
Resistance	R	20 k Ω				
Ramp time (adjustment range)	t	100 ms...5 s	60 ms...5 s			
Type of connection (cable gland)		4 screw terminals				
Cable diameter		4,5 ... 11 mm				
Type of connection (M12 component connector)		Component connector, 4-pin, M12x1				
Type of connection (solenoid)		Base to EN 175301-803				
Number of pins (solenoid)		2 + PE				
Dimensions		see page 7				
Type of mounting		M3 x 40 mm				
Permissible operating temperature range (amplifier with cable gland)	ϑ [°C]	-25 ... +70	-25 ... +70	-25 ... +60	-25 ... +70	-25 ... +70
Permissible operating temperature range (amplifier with M12 component connector)	ϑ [°C]	-25 ... +70	-25 ... +70	-25 ... +50	-25 ... +70	-25 ... +70
Storage temperature range	ϑ	-25 ... +85 °C				
Type of protection		IP65 to EN 60529 with cable mounted/mating connector mounted				
Weight	m	0.125 kg				

¹⁾ Usually corresponds to a cable length of less than 100 m²⁾ With a solenoid resistance of $R = 19.5 \Omega$ and a solenoid current of $I = 100$ mA

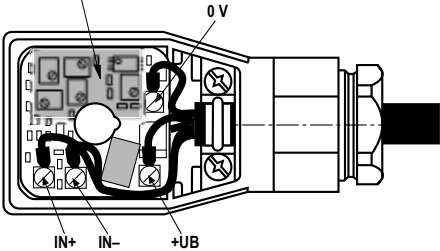
Electrical connection

Terminal / Pin		Terminal / Pin	
+UB / 1	Operating voltage U_B 24 V	IN+ / 2	command value input 24 V; 0...10 V
0 V / 3	0 V ground	IN- / 4	Reference potential wfor command value

Terminal connection

Risk of malfunction in the case of
EMC/ESD interference on the connection cable

Do not route command value connection
cables through this section!

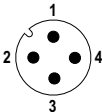


The protective earth conductor connection is accessible
after the electronic printed-circuit board was removed.

Connection cross-section:
4 x 0.75 mm² shielded or
5 x 0.5 mm² shielded (connect shield in control cabinet)
For VT-SSPA1-50:
4 x 1.5 mm² shielded (connect shield in control cabinet)
Cable diameter: 4.5 ... 11 mm

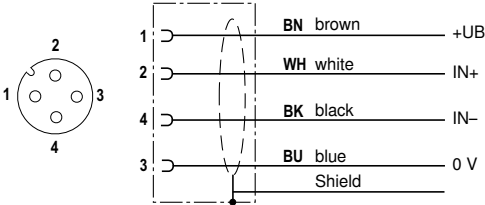
M12 plug-in connector connection

Component connector on amplifier



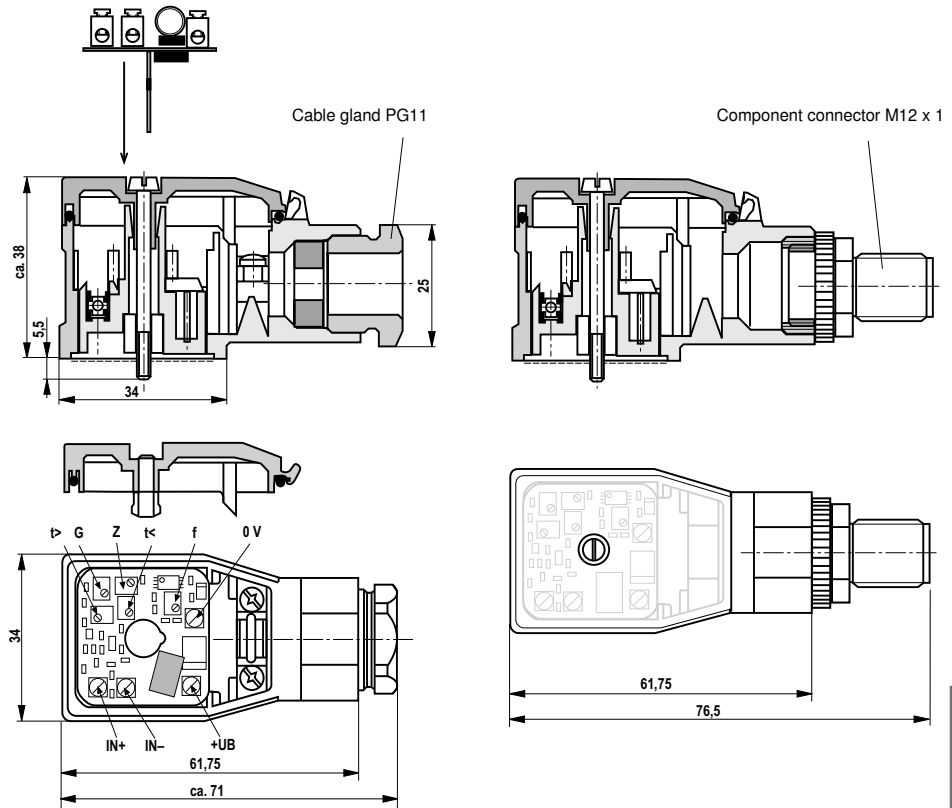
Mating connector and wire color of ready-to-connect cable kit

Please order cable kit separately, see page 2



A protective earthing conductor connection
is not provided

Connection cross-section:
4 x 0.75 mm² shielded
(connect shield in control cabinet)

Control elements / dimensions (dimensions in mm)

Top view on open housing:

G: Command value attenuator / maximum current

Z: Zero point potentiometer / biasing current

t<: Ramp time "up"

t>: Ramp time "down"

f: Frequency range

Engineering / maintenance notes / supplementary information

- The plug-in amplifier may only be wired when disconnected from the power supply.
- Do not lay cables near power cables!
- The distance to aerial lines, radio sources and radar equipment must be at least 1m.
- Use a measuring adapter for adjusting the potentiometers and for checking the current values, and measure currents electrically isolated.
- The specified maximum solenoid currents must not be exceeded.
- Do not use solenoids with integrated free-wheeling diodes.
- The supply voltage must be protected by means of a fuse - see technical data.

Note:

The solenoids are controlled with a clocked voltage. The intensity of the solenoid voltage impulse corresponds to the applied operating voltage ($+U_B$).

Solenoids with integrated EMC suppressor circuit may only be used, if the permissible solenoid voltage - both, for positive and negative voltage - is greater than the actual operating voltage.

Please observe the manufacturer's information.

Note:

- In the case of strongly fluctuating operating voltage, it may be required to provide an external smoothing capacitor having a capacitance of approx. 470 μF to 2200 μF .
- The cable length should not exceed 50 m. For longer lines, a capacitor with $C \geq 100 \mu F$ has to be connected between U_B and 0 V. The line between capacitor and plug-in amplifier must not be longer than 50 m.

Recommendation: Capacitor module VT 11110 (see RE 30750) sufficient for up to 5 plug-in amplifiers

Electro-Proportional Pressure Reducing and Relieving Cartridge Valves

Designation	Description	Cavity	Data sheet	Pages
Proportional pressure reducing valve, direct operated	MHDRE 02	Special	RE 64658	1159
Proportional pressure reducing valve, direct operated	MHDRE 04	Special	RE 64666	1169
Proportional pressure reducing valve, direct operated, rising characteristic curve	MHDRE 06	Special	RE 64655	1177
Proportional pressure reducing valve	FTDRE 2	Special	RE 58032	1187
Proportional pressure reducing valve	FTDRE 4	Special	RE 58038	1191
3/2 directional valve with solenoid actuation	FTWE 2	Special	RE 58007	1197
3/2 directional valve with solenoid actuation	FTWE 4	Special	RE 58008	1201

